MOORHOUSE SPORTHORSES
BUSINESS MANAGEMENT SYSTEM

For MOORHOUSE HORSEBOXES

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Abstract

Moorhouse Sporthorses (MSH), a well established family business operating in the North East of England. They provide a bespoke service to an elite base of regular customers, buying, selling and training sport horses. The business operates in the private sector as part of a complimentary group of companies who also sell individually built horseboxes and commercial vehicles.

Business has been conducted very traditionally, being passed through family generations since the early 1900’s. The current business owner, Mr William Moorhouse, has had a lifetime association in the equestrian world. Business has seen limited change since its early conception, extremely well known for providing distinctive and professional service to its clientele throughout the years. No information technology solutions were utilised which meant limited market and market opportunities, as advertising and market research was not truly possible on a wide-scale. The Client base, although limited, was well established with personal service perceived to be key to business success.

The company felt it was time to move the business into the twenty first century, wishing to challenge their current working practices and procedures. Will the company gain competitive advantage by moving from an existing profitable structure to something new? What is the benefits change could provide? Can such a traditional company, operating with a personal service, move into the e-business world to gain future marketability and profitability?

Academically, the aim was to fulfil the requirements of the BSc Part-Time Computer Studies Degree project, by utilising attained study skills, developing and stretching personal capabilities. This was achieved by combining: the web creation skills gained during academic course of study; drawing from personal and business experience; acquiring and learning new skills and employing a number of methodologies to help provide project structure.

In summary, the report analysed current business to provide possible future options. It questioned the benefits of changing the current Business Systems and concluded by presenting the Client with a possible e-business solution.
Acknowledgements

I am grateful to a number of people for their support and assistance during both the preparation of this report and throughout my degree studies.

Firstly, I would like to thank the numerous lecturers throughout my course of study, both at Teesside and Durham University. They have provided me with excellent resources and thought inspiring material from which to build.

My thanks go also to all the members of the Moorhouse Group of Companies. The opportunity to work on a real live project has been invaluable. Additional thanks go to the customers of MSH who kindly agreed to participate and provide invaluable information relating to the questionnaire and helped test the website prior to launch.

Finally and by no means least, I would like to thank my family and friends for their love and support, in what has been a very time consuming but thoroughly enjoyable project. Special thanks go to my daughter, aged 8, for drawing a lovely picture below, her recollections of mammy working on the project.
CONTENTS

1 PROJECT INTRODUCTION ................................................................. 1
  1.1 COMPANY BACKGROUND .......................................................... 1
  1.2 PROJECT SCOPE ........................................................................ 2
    1.2.1 University Project Proposal .................................................... 2
    1.2.2 University Project Specification .............................................. 2
    1.2.3 Feasibility Study .................................................................... 2
    1.2.4 Company Project Scope .......................................................... 2
  1.3 PLANNING AND SCHEDULING OF PROJECT WORK ..................... 3
  1.4 KEY OBJECTIVES AND REQUIREMENTS ..................................... 5
    1.4.1 Project Objectives ................................................................. 5
    1.4.2 Personal Objectives ............................................................... 6
  1.5 STANDARD, PROCEDURES AND LEGAL ISSUES ......................... 6
    1.5.1 British Computer Society (BCS) Code of Conduct ....................... 6
    1.5.2 Ethical Issues ....................................................................... 7
    1.5.3 Legal Issues ....................................................................... 7
    1.5.4 Plagiarism ......................................................................... 8
  1.6 SYSTEMS DEVELOPMENT STRATEGY ......................................... 8
  1.7 TECHNIQUES .......................................................................... 9
  1.8 SETTING GOALS ..................................................................... 9

2 METHODOLOGY .............................................................................. 11
  2.1 AVAILABLE/CHOSEN DEVELOPMENT METHODOLOGIES .......... 11
  2.2 SYSTEM ANALYSIS AND DESIGN ............................................. 15
  2.3 POTENTIAL/CHOSEN WEB METHODOLOGY: RUMM (VERSION 2) AND UCWD ......................................................... 17
  2.4 RESEARCH METHODS ............................................................... 20

3 SYSTEM MODELLING .................................................................. 22
  3.1 SYSTEMS ANALYSIS ................................................................. 22
    3.1.1 Statement of Purpose ............................................................. 22
    3.1.2 Requirements List .................................................................. 23
      *Horses refers to both the sale of horses and ponies................................. 23
    3.1.2.1 Requirement (1): Increase Customer Base ............................... 23
    3.1.2.2 Requirement (2): Maintain Stock of Horses and Record Horse Transactions ... 23
    3.1.2.3 Requirement (3): Individually Designed Software ................. 24
    3.1.2.4 Requirement (4): Mimic Offline Service with Online Service .......... 24
    3.1.2.5 Requirement (5): Record Customer Details ............................ 24
    3.1.2.6 Requirement (6): Improve Enquiry Management .................... 24
    3.1.2.7 Requirement (7): Record Supplier Details ............................... 25
    3.1.2.8 Requirement (8): Improve Real-Time Cost Reporting ............... 25
    3.1.2.9 Requirement (9): Increase Use of Digital Technology ............... 25

3.1.2.10 Requirement (10): Enhance Customer Experience ................. 25

3.1.2.11 Requirement (11): Increase Sales ......................................... 25

3.1.2.12 Requirement (12): Improve Customer Service ........................ 25

3.1.2.13 Requirement (13): Reduce Staff Time .................................... 25

3.1.2.14 Requirement (14): Increase Efficiency .................................... 25
3.1.2.10 Requirement (10): Improve Internal / External Communications ........................................ 25
3.1.2.11 Requirement (11): Utilise Mobile Technology ........................................................................ 25
3.1.3 Context Diagram ..................................................................................................................... 26
3.1.4 Events List .................................................................................................................................. 27
3.1.5 Dataflow Diagrams (DFD) ......................................................................................................... 28
3.1.5.1 Top Level DFD .................................................................................................................... 29
3.1.5.2 Low Level DFDs .................................................................................................................. 30
3.2 WEB ANALYSIS .......................................................................................................................... 36
3.2.1 Sporthorses Competition Research .......................................................................................... 36
3.2.2 Sporthorses Market Research ..................................................................................................... 37
3.2.2.1 Estimated Market Value and Share ...................................................................................... 38
3.2.3 Internet Usage/Population Statistics ........................................................................................ 39
3.2.4 Mobile Phone Usage ............................................................................................................... 42
3.2.5 Web Browsers Display ............................................................................................................. 43
3.2.6 Wireless Application Protocol (WAP) Technology .................................................................. 45
3.3 SUMMARY OF ANALYSIS ........................................................................................................... 46

4 SYSTEM DEVELOPMENT .................................................................................................................. 48
4.1 SYSTEM DESIGN .......................................................................................................................... 48
4.1.1 Data Dictionary ......................................................................................................................... 48
4.1.2 Hardware/Software Requirements ........................................................................................... 52
4.2 DATABASE DESIGN ...................................................................................................................... 54
4.2.1 The Three Tier Architecture .................................................................................................... 55
4.2.2 Database Implementation ......................................................................................................... 55
4.2.3 Entity Relationship Diagrams (ERD) ...................................................................................... 56
4.3 WEB DESIGN .................................................................................................................................. 57
4.3.1 Mission ....................................................................................................................................... 57
4.3.2 User Requirements ................................................................................................................... 58
4.3.2.1 Target User ........................................................................................................................... 58
4.3.2.2 Personas ............................................................................................................................... 59
4.3.2.3 Current User Method of Purchase/Information Seek ............................................................ 61
4.3.2.4 Utilising RUMM Version 2 ................................................................................................... 61
4.3.2.5 Visual Map ........................................................................................................................... 69
4.3.3 Conceptual Design .................................................................................................................... 71
4.3.4 Web Designer Specification ....................................................................................................... 71
4.3.5 Creative Influences ................................................................................................................... 72
4.3.5.1 Web Storyboards .................................................................................................................. 72
4.3.5.2 Colour Palette ....................................................................................................................... 75
4.3.5.3 Moodboard ........................................................................................................................... 75
4.3.6 First Design Sketch .................................................................................................................... 76
4.3.7 Navigation Chart ........................................................................................................................ 77
4.4 LOGO DESIGN .............................................................................................................................. 78
4.5 SUMMARY ....................................................................................................................................... 79
5 SYSTEM IMPLEMENTATION.................................................................................................................. 80
  5.1 PHYSICAL IMPLEMENTATION........................................................................................................ 80
  5.1.1 Physical File Structure............................................................................................................... 81
  5.1.2 CSS Style Sheet......................................................................................................................... 83
  5.1.3 XHTML (eXtensible Hyper Text Markup Language)................................................................ 83
  5.1.4 PHP Overview.......................................................................................................................... 84
    5.1.4.1 PHP Flow Chart................................................................................................................. 85
    5.1.4.2 Script Explanation (Summarised)....................................................................................... 86
    5.1.4.3 Programming Highlights.................................................................................................. 90
  5.2 PHYSICAL WEBSITE INTERNET IMPLEMENTATION............................................................... 107
    5.2.1 Domain Registration and Internet Service Provider (ISP) Selection..................................... 107
    5.2.2 Establishing a Holding Page.................................................................................................. 109
    5.2.3 Web Server and Database Platform Required....................................................................... 109
    5.2.4 Prototype Hosting Area......................................................................................................... 111
    5.2.5 Training.................................................................................................................................. 111
    5.2.6 Final Deployment/Handover................................................................................................ 113
    5.2.7 Website Maintenance Guide (for Developers and Programmers)...................................... 113
  5.3 SECURITY CONSIDERATIONS...................................................................................................... 114

6 TESTING................................................................................................................................................ 115
  6.1 CONTINUOUS DEVELOPMENT TESTING................................................................................. 115
  6.2 USER INTERFACE TESTING USING XHTML VALIDATION TOOLS.................................... 115
    6.2.1 XHTML/stylesheet Testing.................................................................................................... 115
  6.3 WEB BROWSER TESTING........................................................................................................... 117
  6.4 SYSTEM FUNCTIONALITY TESTING.......................................................................................... 119
  6.5 ACCESSIBILITY TESTING........................................................................................................... 120

7 CRITICAL REVIEW.................................................................................................................................. 122
  7.1 PERSONAL AND ACADEMIC ACHIEVEMENTS/REFLECTION............................................... 122
  7.2 PRODUCT REVIEW....................................................................................................................... 128
  7.3 PROCESS REVIEW......................................................................................................................... 133
    7.3.1 Methodology.......................................................................................................................... 133
    7.3.2 Evaluation: Formative/Summative......................................................................................... 134
  7.4 PROJECT REVIEW........................................................................................................................ 135
    7.4.1 End Project Status: University of Teesside BSc Project Deliverables 2008.................... 135
    7.4.2 End Project Status: MSH Project Deliverables 2008.......................................................... 136
  7.5 CONCLUSION.............................................................................................................................. 137

8 RECOMMENDATIONS .......................................................................................................................... 139

9 REFERENCES........................................................................................................................................ 141

10 BIBLIOGRAPHY.................................................................................................................................. 156
11 APPENDIX............................................................................................................................................... 165

11.1 APPENDIX 1: LIST OF ABBREVIATIONS/SPECIAL TERMS......................................................... 165
11.2 APPENDIX 2: PROJECT PROPOSAL ................................................................................................. 165
11.3 APPENDIX 3: PROJECT SPECIFICATION ....................................................................................... 165
11.4 APPENDIX 4A: SUMMARY OF BASIC FEASIBILITY STUDY .......................................................... 165
APPENDIX 4B: 7PS MARKETING MIX ANALYSIS FOR MSH ................................................................. 165
11.5 APPENDIX 5A: DRAFT OVERVIEW UNIVERSITY DELIVERABLES 24/04/07 ..............................
APPENDIX 5B: UNIVERSITY PROJECT DELIVERABLES AMENDED 09/07 ........................................
APPENDIX 5C: CLIENT PROJECT DELIVERABLES 26/6/07 ................................................................. 165
11.6 APPENDIX 6: DRAFT PROJECT SCHEDULE .................................................................................... 165
11.7 APPENDIX 7A: DETAILED PROJECT SCHEDULE (24/4/07) ......................................................
APPENDIX 7B: AMENDED PROJECT SCHEDULE (26/6/07) .................................................................
APPENDIX 7C: COMPLETED PROJECT SCHEDULE (20/4/08) ........................................................... 165
11.8 APPENDIX 8A: PROJECT SUPERVISOR MEETING MINUTES ....................................................
APPENDIX 8B: PROJECT CLIENT MEETING MINUTES ...........................................................................
11.9 APPENDIX 9: EXAMPLE MONTHLY PROJECT ACTIVITY LOG .................................................. 165
11.10 APPENDIX 10: ETHICAL RELEASE FORM (TO BE COMPLETED BY SUPERVISOR) .................... 165
11.11 APPENDIX 11: PERSONAL RESEARCH MSH CURRENT/POTENTIAL CLIENTS AND MARKET RESEARCH ................................................................. 165
11.12 APPENDIX 12: RESULT SUMMARY OF COMPETITOR VISUAL MAP EXERCISE ...................... 165
11.13 APPENDIX 13: COPY OF ARTWORK FOR MSH Logos ................................................................. 165
11.14 APPENDIX 14: CLIENT LETTER AUTHENTICATING/SIGN OFF WORK ....................................... 165
11.15 APPENDIX 15: HARD COPY OF PHP SOURCE CODE ................................................................. 165
11.16 APPENDIX 16: COPY OF CSS STYLESHEET, JAVASCRIPT CODE, ASSET REGISTER AND IMAGES ................................................................. 165
11.17 APPENDIX 17: MSH USER GUIDE ................................................................................................. 165
11.18 APPENDIX 18: COPY OF MSH WEBSITE PRESENTED ON 2 X CDs ........................................ 165

12 FIGURES/TABLES .................................................................................................................................... 166
1 PROJECT INTRODUCTION

This project primarily fulfils the criteria of The University of Teesside BSc Computer Studies Final Year Project. The live project was chosen to challenge, “stretch” and encompass all academic learning to date within a real life situation.

The project format could have followed:

- Business Requirements
- Website Requirements

However, it was considered that an integrated approach was appropriate so that, as a business issue was identified, a web based solution was developed.

Reference to abbreviations and special vocabulary can be seen in Appendix 1.

1.1 Company Background

Moorhouse Sporthorses (established 1943) is a well established, privately owned UK company, trading and training sport horses for the National and International marketplace. Currently, their marketplace was restricted to repeat business and business referrals. The company were financially sound with good product stock, having an unrivalled personal reputation with steady sales.

The company currently has no Internet presence. However, it does possess computer hardware, knowledge of the Internet utilising e-mail and on-line product ordering and is a significant user of mobile phones. They are forward thinking, realising the potential to widen their market, increase customer base and improve customer services. This move was also seen to be a key strategy in securing its future.

The company approached me to develop and build upon its current Marketing and Internet Strategy, to look at business systems and make proposals on how an Internet presence could expand and secure their future market. Approved justification resulted in the production of a prototype front-end website with back-
end functionality [1]. Successful completion of this project would mean a more stable, secure and varied marketing approach, from which to consolidate and improve services to current customer base and attract future customers using modern technologies i.e. the World Wide Web.

1.2 Project Scope

Good Project Management skills and defining exact requirements improved the chance of project success [2].

1.2.1 University Project Proposal

The project proposer was Mr W Moorhouse, Managing Director of MSH. The company project was sourced from my own contacts. The first project requirement was to submit the Project Proposal to the University for approval by the Project Supervisor (Appendix 2).

1.2.2 University Project Specification

Following Project Proposal acceptance, the second requirement was to submit a more detailed Project Specification (Appendix 3). This was also approved.

1.2.3 Feasibility Study

Along with the Project Proposal and Specification, a basic Feasibility Study was undertaken to examine the current situation and look at the possibility of using technology to make improvements, together with 7Ps marketing mix analysis.

Summary of the findings shown in Appendix 4 A and B indicated an economic, technical, operational and educational viability of the project.

1.2.4 Company Project Scope

The project scope was clearly defined with the company at the project start. Documentation was signed, with requirements and responsibilities being agreed by each party. In brief, the project scope included current business analysis with
a view to widening their market by justifying and producing a prototype website suitable for the target audience, to fulfil the Client objective of marketing their products using the World Wide Web (WWW). The prototyping model, Figure 1.1 continually looked for improvements, using a classic model of:

- Research
- Design
- Develop
- Test and Review

![FOUR STAGES OF WEBSITE PROTOTYPING](image)

Figure 1.1: Prototyping Model, D Chaffey, Internet Marketing [3]

The company will be given a copy of the report, detailing all aspects of the project from initial set-up to handing over the finalised prototype Website i.e. the set of Project Deliverables to be agreed in Section 1.3.

The finalised prototype will provide a point of presence from which to build upon if required. It will offer a simple interactive website, the company’s virtual business card and focus on improving the company image, strengthening customer service, widening its market, and supplementing existing advertising media.

### 1.3 Planning and Scheduling of Project Work

A draft overview of University Deliverables (Appendix 5A) was produced at project start, after reviewing the University Project Supervisor’s Project Website [4]. This document was amended in September 2007 due to University of Teesside requirement changes between 2006/2007 and 2007/2008, along with changes made to delivery dates granted by the Client and University (Appendix 5B).

A draft Project Schedule was produced (Appendix 6) and superseded with a more detailed plan 24/04/07 (Appendix 7A) and amended on 26/06/07 (Appendix 7B). The overall planning procedure has been developed to allow for changes.
Contingency planning was put in place to deal with all eventualities to keep the project in line with requirements.

Table 1.1 shows the current Project Deliverables and proposed timescale, as agreed with M Nawaz (Project Supervisor), University of Teesside.

Table 1.1 Teesside University BSc Project Overview and Deliverables 2008 (Amended 24/1/08)

For the agreed “Detailed Deliverables” with the Client see Table 1.2, Appendix 5C.

Table 1.2 MSH Project Deliverables 2008 (Amended 24/1/08)

Project milestones were used at the end of each major phase i.e. Analysis, Design, Implementation and Testing, to keep the project on time.
Communication, feedback and project status were on-going and implemented by means of regular meetings with both the Project Supervisor and Client. An example of these meetings can be seen in Appendix 8A and 8B. Project Activity Logs separated workload sections (Appendix 9). The Client has asked that due to the confidentiality and sensitivity of the information that not all Logs are made publicly available, however if required they will consider making them available upon request.

1.4 Key Objectives and Requirements

Importance was placed on identifying the key objectives and project requirements in the early stages. This helped to identify the scope of the project and acted as a benchmark to measure effectiveness of work at the end of the project (hence the relevance of the table format and numbering for ease of understanding).

1.4.1 Project Objectives

Early discussions with the Client identified an initial list of both website and business requirements, see Table 1.3. A specific set of website requirements was agreed in Section 3, i.e. a Requirements List.

Table 1.3 Project Objectives for Moorhouse Sporthorses

<table>
<thead>
<tr>
<th>Type of Objective</th>
<th>No.</th>
<th>Description of Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business/Financial/Strategic</td>
<td>1</td>
<td>To keep the project to cost and time constraints</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>To confirm all legislation and guidelines</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>To create a Content Management System</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>To provide comprehensive project images/information/data to individual customers in target market, better than anyone else</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>To analyse current system, highlight problems and justify development of web technology</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>To test and evaluate the new proposed system</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>To ascertain project meets requirements</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>To identify and anticipate customer requirements to achieve professional standing in the marketplace</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>To improve working efficiency of Director by 10%</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>To develop an interface to input information via WAP technology</td>
</tr>
<tr>
<td>Marketing/Internet Marketing</td>
<td>11</td>
<td>Acquire a customer Internet-based of 100 new clients within the first year</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>Increase the information available about NWS on a 24 x 7 basis</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>Create value added customer services, not currently available on any other site</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>Satisfy the needs of the sporthorse buyer by means of a website</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>To create and keep a customer</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>To provide an Internet presence and secure company website name</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>To offer website-users support services e.g. email and video footage of stock</td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>To keep site fresh and interesting</td>
</tr>
<tr>
<td></td>
<td>19</td>
<td>To translate organisation's strengths of reputation and personal service into a successful viewed and used website</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>Website to target niche users (as researched in 3.2.2 of report)</td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>Offer enhanced services to customers who register</td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>To provide basic search engine optimisation i.e. register site with Google</td>
</tr>
<tr>
<td>University Objectives</td>
<td>23</td>
<td>To implement a suitable Development Methodology</td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>To document the project process</td>
</tr>
</tbody>
</table>

C Moorhouse

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1.4.2 Personal Objectives

At project start, personal objectives were set, identified in Table 1.4. They would then be measured at the end of the project as part of the Critical Evaluation.

Table 1.4 Personal Objectives

<table>
<thead>
<tr>
<th>PERSONAL OBJECTIVES SET FOR MSH PROJECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>To source a suitable challenging project</td>
</tr>
<tr>
<td>To meet the criteria needs of the University for the Final Year Project</td>
</tr>
<tr>
<td>To develop and enhance current skills particularly in the field of PHP programming (Hypertext Pre-Processor), systems analysis, data modelling skills and Wireless Application Protocol (WAP) technology.</td>
</tr>
<tr>
<td>To combine creativity with technical accomplishments</td>
</tr>
<tr>
<td>To set challenging but achievable objectives</td>
</tr>
<tr>
<td>To develop my knowledge of XHTML and manually writing code using Notepad</td>
</tr>
<tr>
<td>To hopefully achieve a good grade by producing an excellent business solution for MSH utilising knowledge and skills learnt in a practical way</td>
</tr>
</tbody>
</table>

Customer objectives and requirements were covered in Section 2.4.

1.5 Standard, Procedures and Legal Issues

Development of the project took into consideration: standards awareness along with legal and ethical issues. Upon completion, current standards, issues and procedures will be adhered to in the following areas:

1.5.1 British Computer Society (BCS) Code of Conduct

This project conformed to the BCS Code of Conduct and Code of Practice [5] indicating an expected level of professionalism. Particular consideration was given to the following sections:

- **The Public Interest**: To carryout work or study with due care …(Page 1)

- **Professional Competence and Integrity** … (Page 3)

- **Adhere to Regulations** … (Page 6)
• **Copyright (including Database right):** “Copyright applies to computing and the Internet in the same way as other media material i.e. photographs placed on the Internet will be protected in the same was as other artistic works; any original written work will be protected as literary work etc”.

As a point of note, because this project was live all images were original, supplied by Moorhouse Sporthorses or were specifically designed for Moorhouse Sporthorses e.g. the Moorhouse Sporthorses logo.

### 1.5.2 Ethical Issues

Consideration was taken with regard to BCS Codes of Conduct and Practice, Data Protection, computer security and safety. The guidelines of the Computer Ethics Institute were followed regarding moral and social issues [6]. Project Requirement of Ethical Release Form was signed by Supervisor (Appendix 10).

### 1.5.3 Legal Issues

The following issues were addressed from the guidelines:

- **Data Protection:** Ensured all data was kept in accordance with recognised standards in a safe and confidential manner. The Data Protection Act 1998 regulates how and when information relating to individuals may be obtained, used and disclosed. As part of the act, a member of the Moorhouse Management structure needed to be held responsible for Data Protection issues, as per the act.

- **DEFRA:** Website content conformed to industry recommendations with stock correctly and legally described with no misinterpretation of data.

- **Accessibility:** Website conformed to current accessibility recommendations of the Web Accessibility Initiative (WAI), Web Content Accessibility Guidelines (WCAG), Section 508 and 1995 Disability Discrimination Act (DDA), World Wide Web Consortium (WC3) [7].

- **Domain Name Registration/Logo:** Registration acquired through Nominet, the recognised governing body of registration. Logo designed by C Moorhouse and copyrighted to MSH.

- **Disclaimers/Privacy Statement/On-line Liability Insurance**
1.5.4 Plagiarism

The University of Teesside had a strict policy on copying and plagiarism. Reference was made to University of Teesside links regarding professional referencing and report writing [8].

1.6 Systems Development Strategy

The overall strategy to choose the Systems Development Methodology was carried out by analysing, researching [9], questioning, justifying and implementing the appropriate methods. The Internet Marketing Strategy and website were seen as an integral part of the company.

Figure 1.2 shows interaction of three main areas. Strategic Planning was used to develop company objectives and resources to take into consideration the changing opportunities of the Internet.

Systems Development Methodology was analysed and discussed, with the chosen methodology justified in Section 2. Implementation of the Systems Development Strategy was covered in Section 2.
1.7 Techniques

Research indicated a benefit of successfully defining the objectives, requirements, to fulfil overall requirements and eradicate problems prior to implementation [11]. Data Flow Diagrams, Data Dictionaries, Normalisation and Entity Relationship Diagrams are all examples of tools and techniques utilised.

Recognised methods were used to analyse business requirements. A recognised data modelling process using a Database Management System (DBMS) MySQL, controlled the organisation, management, storage and retrieval of data in the database. Yourdon’s notation on Modern Structured Analysis [12] was used to model the business process both in a graphical and written format.

1.8 Setting Goals

An initial Internet Marketing Plan was discussed with the Client who set out realistic goals and objectives, relating to their Marketing Plan. Strategic goal setting was based on the company’s corporate objectives, see Figure 1.3. The relationship between goal setting and measurement was also taken into account.

Figure 1.3 Simple Framework for Internet Strategy Development [3]
Figure 1.4 MSH Project Mind Map [13]

Figure 1.4 shows an overview of the entire project using mind mapping software to simplistically visualise the project in context, a technique used frequently throughout the project to create ideas.
2 METHODOLOGY

Following the introduction, this section researched, considered and documented the System Development Lifecycles (SDLC) and the System Development Methodologies (SDM) available providing justification of the chosen elements.

“A software development method is usually based on a life cycle model of system development and has a number of development phases with a set of steps and rules for each phase. Whereas a life cycle coarsely partitions the development of a system into stages, a development method takes a life cycle and further divides each stage into steps. A development method prescribes in detail, tasks involved in each step, the nature of each task, the order the tasks need to be done, what documents are created at each stage and what documents are required as input to each stage. In fact, it provides a detailed plan for producing a system.” [14]

What is a Methodology?

According to FOLDOC (Free On-Line Dictionary of Computing):

“An organised, documented set of procedures and guidelines for one or more phases of the software life cycle, such as analysis or design. Many methodologies include a diagramming notation for documenting the results of the procedure; a step-by-step ‘cookbook’ approach for carrying out the procedure; and an objective (ideally quantified) set of criteria for determining whether the results of the procedure are of acceptable quality”. [15]

2.1 Available/Chosen Development Methodologies

“Successful systems development will require developer to follow a Systems Development Life Cycle (SDLC) and to use a development methodology (method)”. This quote by A Marshall [16] was the basis of the project development using both an SDLC and a Development Method. It was felt that System Development methodology provided the structured framework to enable effective creation of the information system and software development [17].
“Commercial Web Development services emerged in 1995.” [18] The industry was tarnished with poor and unprofessional services, as initially the methodology was technology driven i.e. “did it work?” Client requirements were the only consideration with no thought for the user.

Choice of methodology was aided by using a document entitled “Selecting a Development Approach” [19], which highlighted the acceptable systems along with their strengths and weaknesses. Reference was also made to “A Comparison of Software Development Methodologies”, paper by Reed Sorensen, Software Technology Support Centre [20].

Methodologies such as the “Waterfall” are generic, tried, tested and proven project management tools.

Potential System Development Methodologies researched included:

- Waterfall (Linear)
- Prototyping
- Incremental (Combination of Linear and Iterative Waterfall)
- Spiral
- Rapid Application Development (RAD)

The most well known and oldest model viewed was the Waterfall (steps usually occur in a predefined order, as a step finishes, the process goes to the next step). Although a logical process (dividing the development processes into a series of manageable parts that relate to each other in an organised way), problems were anticipated if amendments or backtracking occurred. In response to weakness, an iterative and incremental development was added to enable rework and overlapped sections. Table 2.1 compared the models strengths and weaknesses.
Proven research led to the chosen and most appropriate web development approach i.e. methodology of a SDLC and Method combination, to provide precise requirements to fulfil overall objectives to reduce the risk of failure.

Consideration was also given to criteria such as performance, size, cost and suitability, i.e. PRINCE 2 (PRojects in Controlled Environments) and Method 123, were felt to be better suited to larger projects.

A hybrid approach of adopting a Prototyping (Figure 2.1) and Iterative Waterfall (Figure 2.2) were also chosen because they were established methods to best fulfil current project need. An important feature was that whilst developing Client requirements, gradual implementation meant the effect of changes could be monitored.
The chosen SDLC [20], Figure 2.3, incorporated the classical stages (excluding maintenance as this was a prototype):

- Feasibility Study
- Systems Analysis
- Systems Design
- Construction
- Implementation
SDLC also recognised the system was developed in a series of phases, with one phase to be completed before the next commenced. Recognition was also given that the programming phase would be commenced after determination of user requirements and system design.

A structured methodology was an overall project requirement however it also formalised and documented [25] the progress of the project. Appropriate and current technologies were used to produce the final solution.

2.2 System Analysis and Design

Analysis and Design were two of the phases in the SDLC. More specific methodologies were used to formalise the approach, adopting a more quantified set of criteria to determine acceptable results.

Possible researched methodologies included:

- Soft Systems Method referred to by A Marshall at the University of Teesside
- Structured Systems Analysis and Design Method, more suited to large scale projects [26]
- MERISE, more suited to large scale projects
- Information Engineering, again more suited to large scale projects.
- Yourdon Systems Method, Yourdon 1993 [12], similar to Structured Analysis, Design and Implementation of Information Systems
- (STRADIS)
- User-Centered Web Development (UCWD)
- Rapid User Modelling Method (RUMM)

A pragmatic approach was opted for in this project and the adopted methodology was formed from a hybrid of: Connolly and Begg’s [27] Practical Approach to Design, Implementation and Management using a Database Management System (DBMS) and Yourdon [12].

Yourdon was chosen as it placed more importance on data structures, seen as being more relevant to this project.
The Database Application Lifecycle followed the following stages [27]:

- Database Planning
- System Definition
- Requirements Analysis and Collection
- Database Design
- DBMS Selection
- Prototyping
- Implementation
- Data Conversion and Loading
- Testing

Figure 2.4 Stages of the Database System Development Lifecycle, Connolly & Begg [27]
Databases were regarded as the underlying framework of the Information System. The chosen methodology was proven to be effective and efficient. Connolly and Begg offered a system which followed the development lifecycle, Figure 2.4, and covered analysis, design and implementation. It was chosen for its simple process, its ability to cover both the academic and business project requirements and provide tried and tested results. The methodology acted as a framework and along with the two phases of logical and physical, covered all project demands.

The implementation of the methodology was fully discussed in Section 3 and software requirements in Section 4.

2.3 Potential/Chosen Web Methodology: RUMM (Version 2) and UCWD

Consideration was given to a number of different methodologies. The first consideration was John December [28], an information development methodology designed for the web. The disadvantage however was perceived to be an “unbalanced” approach as it concentrated on analysing the problem and user with limited thought for the application design along with non-required elements of promotion and innovation for this project. SWM [29], Simple Web Method, was thought to be very similar to RUMM but had the added advantage of gathering information on additional headings i.e. Statement of Purpose, Audience, Constraints, Market, Navigation, Content and Design Documentation.

Research by Lang & Fitzgerald [30] suggested data in the following Table 2.2.

<table>
<thead>
<tr>
<th>Summary of Findings by Lang &amp; Fitzgerald on Web Development</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Methodology</strong></td>
</tr>
<tr>
<td>In-house hybrid methodologies prevail</td>
</tr>
<tr>
<td>Legacy Software Development</td>
</tr>
<tr>
<td>Rapid Application Development &amp; Extreme Programming</td>
</tr>
<tr>
<td>Tool specific J2EE, ASP, Flash, PHP</td>
</tr>
<tr>
<td>Object Orientated, Rational Unified Process</td>
</tr>
<tr>
<td>UML (Unified Modelling Language)</td>
</tr>
</tbody>
</table>
Chosen methodology was the User Centered Web Development (UCWD) [31] along with RUMMv2 [32] to improve performance and user acceptance, plus elements of SWM [29] to enhance understanding. Research also indicated cost savings could be achieved by adoption of Usability Engineering Methods [33].

This hybrid methodology was felt to produce a more refined application in terms of functionality, navigation, accessibility and a user centered approach. The process of user-centered design was based on the feedback from the end user. The development process commenced with the initial idea, determined the website mission, collected requirements, designed pages, performed usability tests and implemented the prototype.

RUMM Version 2 had the possibility of being used in isolation but was intended to be used in conjunction with the above methodologies i.e. UCWD to improve the possibility of a poor application in terms of performance and user acceptance. The principle of the methodology was based on the knowledge that not all detailed information was accessible or available at project start. Users were defined as Actors in order to consider application interaction from possible non-human sources e.g. web services/search engines.

This methodology intended to produce a more functional, navigable and accessible application by using the methodology but acted as a cognitive aid. Figure 2.5 shows RUMM overview whilst Figure 2.6 shows UCWD stages.

Overview of RUMM Methodology

Figure 2.5 RUMM Version 2 [32]
The Methodology has six stages [31]:

- Define Mission
- Collect User Requirements
- Conceptual Design
- Create Physical Design
- Usability Testing
- Implement & Market
- Evaluate & Improve

RUMM Methodology is a subsection of Relationship Management Methodology (RMM) [35]. Considerable research was undertaken in this field to propose RMM as the design and construction of this hypermedia application. RMM would enable information to be grouped logically improving overall development with particular reference to content, navigation and accessibility.

Figure 2.7 shows the RMM design methodology, the arrows depicted processes stages. This graphical representation shows the methodology within the context of the complete software development cycle.
The prime advantage of this methodology is that it specifically relates to hypermedia projects. Streitz [36] noted hypermedia projects may involve people with different skill sets and design of hypermedia applications involved capturing and organising the structure, making it clear and accessible to users.

Figure 2.8 shows usefulness of RMM approach. Product catalogues and hypermedia front-ends of databases are highly structured and volatile, making RMM methodology particularly appropriate to this project.

![Figure 2.8 Usefulness of RMM Approach [35]](image)

### 2.4 Research Methods

Research and methodology was seen as important to the project and was applied to various project elements to provide more meaningful information from which to justify the final solution. Awareness was gained of the Information Search Process Model developed by Carol Kuhlthau in the 1980s which recognised uncertainty and anxiety as normal feelings when searching for information. Adoption of the stages in this model i.e. Initiation, Selection, Exploration, Formulation, Collection and Presentation, meant a substantial quality of research material was uncovered.

Research took place regarding the use of both qualitative and quantitative research [37]. Social science researchers (Lincoln & Guba, 1985; Schwandt, 1989) perceive qualitative and quantitative approaches as incompatible; others (Patton, 1990; Reichardt & Cook, 1979) believe that the skilled researcher can successfully combine approaches [38].
The findings meant the use of qualitative research would be conducted as an approach rather than a set of techniques and a combination approach would be undertaken.

Structured research methods were used to produce new information. Exploratory research identified new problems, Constructive Research developed problem solutions and Empirical Research tested the feasibility of the solution based on evidence.

Primary, secondary, market, marketing and focus group research also took place, including information gained from regular Client meetings registered in the Monthly Project Activity Logs, mentioned previously in Appendix 8/9.

Formal project methodology was adopted utilising a series of steps to produce the Project Report and the artefact.

Searches were undertaken by developing a keyword search strategy [39] and utilising the following sources of information:

- Articles
- Books (good for general overview)
- Journals (more specific written by experts/Peer review)
- References from Authority/Field Experts
- Websites with authority and up to date,
- Use of Book databases i.e. Ebrary/netlibrary safari
- On-line Databases, Scopos (good general), Mintel (good marketing research), Zetoc (largest overall)
- Evaluation of Internet Information

In conclusion, a number of methodologies, risks and issues were considered. Overall justification for the choice of methodologies used was based upon the compatibility of the methodology to the project requirements. Structured methodology was used to document the system to a universally accepted standard.
3 SYSTEM MODELLING

The purpose and objectives of Computer Systems Modelling were researched [40]. Findings showed that careful performance modelling and analysis provided crucial guidance for the designer. Various journals were also researched to determine the usefulness of the system tools within the dynamic process of strategy formulation, evaluation and implementation. The paper led the way to adopt a fully integrated management operation with strategic development [41].

Systems modelling techniques were used to visualise, analyse and document the architecture of the system. The models showed the relationships and connections between components. This process assisted in the development of the construction phase. The main components of the design i.e. the Context Diagram, the Entity Relationship Diagram (ERD) and the Data Flow Diagrams (DFDs) all followed the Yourdon notation [12].

The structure and use of an agreed and established web-based information systems framework aided design, whilst the adopted methodology improved the process [42]. Reference was also made to M Nawaz, University of Teesside Intranet site [43].

3.1 Systems Analysis

An analysis of the current business system took place to determine the interactions within the system. Information would be used to provide details for the proposed system and to produce a requirements specification.

3.1.1 Statement of Purpose

The system was intended to be used by the company itself along with buyers and sellers of sport horses. It was proposed to improve business processes, improve service to customers and increase sales and marketing opportunities.
### 3.1.2 Requirements List

Following discussions with the Client, a refined list of issues were identified and agreed as system requirements. This information was summarised and can be seen in a non-prioritised list in Table 3.1.

**Table 3.1: MSH Client System Requirements (May 2007)**

<table>
<thead>
<tr>
<th></th>
<th>MSH CLIENT SYSTEM REQUIREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Increase Customer Base</td>
</tr>
<tr>
<td>2</td>
<td>Maintain Stock of Horses* and Record Horse Transactions</td>
</tr>
<tr>
<td>3</td>
<td>Individually Designed Software</td>
</tr>
<tr>
<td>4</td>
<td>Mimic Offline Service with Online Service</td>
</tr>
<tr>
<td>5</td>
<td>Record Customer Details</td>
</tr>
<tr>
<td>6</td>
<td>Improve Enquiry Management</td>
</tr>
<tr>
<td>7</td>
<td>Record Supplier Details</td>
</tr>
<tr>
<td>8</td>
<td>Improve Real-Time Cost Reporting</td>
</tr>
<tr>
<td>9</td>
<td>Increase use of Digital Technology</td>
</tr>
<tr>
<td>10</td>
<td>Improve Internal/External Communications.</td>
</tr>
<tr>
<td>11</td>
<td>Utilise Mobile Technology</td>
</tr>
</tbody>
</table>

*Horses refers to both the sale of horses and ponies

#### 3.1.2.1 Requirement (1): Increase Customer Base

The business currently relies only on “word-of-mouth” and its reputation, in order to generate sales and new business.

Consequently, the Client is increasingly aware that he has to compete on a wider scale to sustain current business opportunities, let alone improve future sales. Therefore, the Client was very keen for the solution to embrace web technology.

#### 3.1.2.2 Requirement (2): Maintain Stock of Horses and Record Horse Transactions

The business currently has no record other than the “owner’s memory” and basic account details of documenting precise horse sales information. The Client requires more details to conform to forthcoming legislation and to develop an improved business strategy, utilising the knowledge of the most profitable stock.
The Client wishes for the proposed electronic stock list to also serve as the method for advertising and gaining customer interest. Ideally, the Client wishes to record all horse transactions and be able to interrogate these against each horse over a period of time.

3.1.2.3 Requirement (3): Individually Designed Software

The eventual solution needs to be specific to MSH, modelling their business processes and providing unique competitive advantage i.e. achieve market differentiation.

3.1.2.4 Requirement (4): Mimic Offline Service with Online Service

The eventual solution needs to maintain existing Customer Relationship Management (CRM), to give the potential customer the “feeling” they are dealing on a “personal basis” with the owner, as they do at present.

3.1.2.5 Requirement (5): Record Customer Details

An accurate customer list is fundamental to the business. Currently the business do not possess this information in a timely, accurate, and secure manner as some information is mentally stored, whilst the remainder is located in a paper system.

3.1.2.6 Requirement (6): Improve Enquiry Management

The current ability to capture enquiries is limited by the Client’s availability to take calls 24 x 7 x 365 e.g. the owner is often travelling, or with customers, or training horses and is unable to take calls. Consequently, he is losing potential business. Another problem with the current method is that the owner is not always able to document the enquiries comprehensively and information can be lost. Ideally, the owner would like potential customers to log their own enquiries so the accuracy of the information is preserved. Customer enquiries can include both showing an interest in a horse for sale, and offering a horse for sale.
3.1.2.7 **Requirement (7): Record Supplier Details**

The Client currently does not have a structured method to record supplier details. A potential weakness is that important data is not recorded and no other person would have access to this data, if the owner was not available.

3.1.2.8 **Requirement (8): Improve Real-Time Cost Reporting**

The Client needs the ability to view business performance for a given period of all horse related transactions. This is very difficult and time-consuming for the Client to achieve at this time.

3.1.2.9 **Requirement (9): Increase Use of Digital Technology**

The Client needs to take advantage of digital technology to assist with optimising manual processes and to also “engage” more directly with his customer base which is increasingly using digital technology, such as the Internet.

3.1.2.10 **Requirement (10): Improve Internal / External Communications**

Internal communication within MSH between its 5 employees is based solely on verbal and text messages. The Client needs the new systems to provide a method of documenting the business electronically, thus improving access to accurate real-time information.

Externally, MSH wishes to improve its “image” and needs to provide its current customers, and even potential customers, with new information and news about the business. Also, the Client is keen to communicate new horses for sale. All such communications need to be achieved using the minimum of manual effort.

3.1.2.11 **Requirement (11): Utilise Mobile Technology**

Ideally, the Client needs to update the website using mobile technology. This will improve efficiency and speed of response, improving customer service.
### 3.1.3 Context Diagram

The context diagram, in Figure 3.1, was constructed to identify and represent in an easy to comprehend diagrammatical format, the whole system used by MSH, known as an “environmental model” [10]. The context diagram, DFD’s and Data Dictionary, related and balanced with each other, forming part of the same “environmental model” [12].

![Context Diagram](image)

**Figure 3.1 Context Diagram for Moorhouse Sporthorses**

**Footnote to Context Diagram:**

The entities Management, Non-Management Staff, New Customers, Existing Customers, Sellers and Buyers are labelled as “b” because although logically they have different events, physically they will be modelled using the same data store.
3.1.4 Events List

The events list, shown in Table 3.2, provided a textual list of the environment and events the system needed to respond to, specifically relating to system players, functions and interactions.

The events list links directly to the above context diagram.

Table 3.2 MSH Events List

<table>
<thead>
<tr>
<th>SYSTEM PLAYERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Customer</td>
</tr>
<tr>
<td>1.1 Customer – Any User</td>
</tr>
<tr>
<td>1.2 Customer - Registered</td>
</tr>
<tr>
<td>1.3 Customer - Seller</td>
</tr>
<tr>
<td>1.4 Customer – Buyer</td>
</tr>
<tr>
<td>1.5 Customer - New</td>
</tr>
<tr>
<td>2 Management</td>
</tr>
<tr>
<td>3 Non-Management Staff</td>
</tr>
<tr>
<td>4 Supplier</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SYSTEM EVENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1.1 Any User (Customer) requests information/latest MSH News</td>
</tr>
<tr>
<td>1.1.2 Any User (Customer) makes general enquiry and gets confirmation</td>
</tr>
<tr>
<td>1.1.3 Any User (Customer) generates “Hit” by viewing website</td>
</tr>
<tr>
<td>1.2.1 Registered (Customer) requests log in/modifies/updates their details</td>
</tr>
<tr>
<td>1.2.2 Registered (Customer) gets feedback on login accepted/rejected</td>
</tr>
<tr>
<td>1.2.3 Registered (Customer) logs out</td>
</tr>
<tr>
<td>1.2.4 Registered (Customer) accesses additional information</td>
</tr>
<tr>
<td>1.2.5 Registered (Customer) makes general enquiry and gets confirmation</td>
</tr>
<tr>
<td>1.2.6 Registered (Customer) makes password reminder request</td>
</tr>
<tr>
<td>1.3.1 Seller (Customer) makes sale enquiry and gets confirmation</td>
</tr>
<tr>
<td>1.4.1 Buyer (Customer) makes interest to buy enquiry and gets confirmation</td>
</tr>
<tr>
<td>1.5.1 New (Customer) registers their details and gets confirmation</td>
</tr>
<tr>
<td>2.1 Management adds and updates News items</td>
</tr>
<tr>
<td>2.2 Management adds and updates horse details</td>
</tr>
<tr>
<td>2.9 Management deals with enquiries (general/sellers/buyers)</td>
</tr>
<tr>
<td>2.10 Management requests and receives horse cost reports</td>
</tr>
<tr>
<td>2.11 Management highlight specific Horse(s) for commercial reasons</td>
</tr>
<tr>
<td>3.1 Non-Mgmt modifies/updates horse cost details</td>
</tr>
<tr>
<td>4.1 Supplier provides contact details to MSH Management who add/edit/delete information into MSH System</td>
</tr>
</tbody>
</table>
3.1.5 Dataflow Diagrams (DFD)

The DFDs provided a more in-depth view of the business processes. They explained where information came from, how it would interact with the entities and where the data would be stored.

The diagrams are based on Yourdon's [12] methodology whereby circles represent processes and squares represent entities with arrows representing the flow of information. Figure 3.2 outlined the symbols used in the Yourdon Methodology.

![Dataflow Diagrams (Yourdon Methodology) Table]

Figure 3.2 Dataflow Diagrams (Yourdon Methodology)
3.1.5.1 Top Level DFD

Commercial standardisation was achieved by modelling data using the selected data modelling approach i.e. utilising the information from the Context Diagram and Event List., following the Yourdon methodology [12]. This diagram is an “exploded view” of the context diagram and provides a more detailed view of the entire system. Figure 3.3 shows the Top Level DFD for MSH.

Figure 3.3 MSH Top Level DFD

There are 4 levels of user in the system – public Internet users that do not register, registered users, MSH Staff (Non-Management) and MSH Management.

As can be seen from the diagram there are 7 main processes in the system. The three main areas in the system are the User, Horse and Enquiry process areas. These areas contain the main method of providing users with horse details and also receiving enquiries from users.
The ability to make an enquiry as a user is only available if they register and then login. MSH Non-Management Staff and Management staff can add horse costs. MSH Management can access admin functions that include suppliers list, user list, enquiry list and the cost report.

Other areas, which are still important to the Client, are Suppliers, News, Management Reporting and the general interest in the website (Hitcounter).

Note: non-critical data stores have been omitted from this Top Level DFD.

### 3.1.5.2 Low Level DFDs

The diagrams were further broken down to show the next level to demonstrate more detail as all sub data stores were added, in order for the model to be balanced with the context diagram [12]. Figure 3.4 shows user process.

![User Process Diagram](image)

**Figure 3.4 MSH Low Level DFD 1.1 Manage Users**

Any website user can register. Once registered, they can login and logout. Any user details can be edited by Management users. A “forgot password” option is a very important part of user management, allowing the system to assist the user with password problems. This sends an e-mail to the user’s e-mail address when the “forgot password” feature is used. Figure 3.5 shows supplier process.
1.2 Manage Suppliers

Supplier Management is limited to a record of each supplier’s details. The retrieval of the supplier list and the updating of the supplier information are only allowed by Management Level users.

Supplier details are obtained from suppliers directly either verbally or by e-mail. Suppliers will not use the MSH system directly.

In MSH, the supplier list is used for horse services and horse supplies. Actual suppliers of horses will be recorded in the user table.

The supplier module will serve as a simple supplier contact list. However, it is still a vital tool for the Client, providing an up-to-date centralised list of suppliers.
Figure 3.6 MSH Low Level DFD 1.3 Manage News

Figure 3.6 shows News process. News articles are an important part of communicating with the MSH audience. Any user in the system, even those not logged-in can view news articles, which will be an excellent tool for communicating with all users and enticing potential customers to register.

The Client has requested that only MSH Management level users be permitted to add/update/delete news.

Figure 3.7 MSH Low Level DFD 1.4 Manage Horses
Figure 3.7 shows the horse process. This is a key part of the system. It is the part of the system that manages and generates the horse gallery – the tool used to show a graphical list of horses currently in stock by MSH.

As well as providing information about horses, the gallery is also used as a selection system within the “expressing an interest” enquiry (see Process 1.5).

Horse details can be updated by MSH Management at any time. Registered users (when logged-in) can also upload horses for sale to the gallery. In this case, a horse is uploaded to the gallery as “unapproved” and can only be viewed by MSH Management.

Horse costs will normally be added by MSH Non-Management Staff. Management can also add/edit/delete horse costs. Horse details and Horse Costs are used to calculate the MSH Management Cost Report (see Process 1.6).
Figure 3.8 shows the enquiry process. There are 3 types of enquiry:

- General Enquiry
- Express Interest Enquiry (Buy a Horse Enquiry)
- Sell Offer Enquiry (Upload Horse for Sale)

Enquiry Confirmations are displayed and e-mailed to the user as an important part of user-feedback and professionalism.

MSH Management is able to view all enquiries and deal with them. Once an enquiry is placed, apart from the confirmation no further responses are made to the user. MSH Management has requested this as they simply want to use the website to underpin their personal service, and so, would always prefer to contact the customer directly.

However, using this method the system is able to accurately capture the relevant enquiries at the “data source” – which is a major requirement for this system and guarantee improved communications between all parties concerned.
Figure 3.9 shows the Management Report process. The MSH Management Cost Report provides management with an overall view of current horse stock “performance” and horse sales.

The report uses the horse stock table to calculate the profit made on a horse, by dynamically calculating target price (original cost of horse + sum of costs) x 20%. At any point, MSH Management can see what a horse has cost them to “develop”.

Figure 3.10 shows the Hitcounter process. A “hit” is only recorded when the default/homepage is refreshed within a user’s web browser. MSH Management also only needs this information displayed to them, and not to any other user.

The hitcounter data store simply records a single number – the total hit count.

Consequently, the two main processes in this area are retrieve current hitcounter and increment hitcounter.
3.2 Web Analysis

A prime project challenge was to effectively utilise modern technology, by way of a dynamic database-driven website, to effectively apply and improve upon a very traditional business. Comprehensive analysis enabled a seamless integration of the company’s successful operation off-line onto its potential on-line strategy.

Thorough web analysis was conducted to provide market intelligence to uncover what the current and projected market state and how this can effectively be mapped onto producing a web presence on the World Wide Web. The main objective was to provide an effective user-centred website being fit for purpose and targeted to specific users. This was in-line with the business strategy of operating in a niche market.

3.2.1 Sporthorses Competition Research

Moorhouse Sporthorses key business strategy [44] is to operate in a niche market within the equine world, as shown in Figure 3.11 Michael Porter’s Generic Strategy Model, applied to MSH on-line competition.

![Figure 3.11 Porters Generic Strategy Model applied to MSH and Main On-line Competition](image)

The company not only operate in the sport horses market but also specialise in the sale of the highly accredited “Irish Sport Horse”.

Figure 3.11 indicated the direct on-line competition of MSH. The current overall on-line market leader was www.horseandhound.co.uk, with on-line market niche leaders being www.Irish-horses.com and www.horsemart.co.uk.

Appendix 12 showed results of visual mapping exercise, summarised in Section 4 (4.3.4.3). Home page screen dumps were taken of the leading on-line competition, along with the perceived niche market competition. In summary, research indicated that horse sale websites were not fulfilling target user need. A simple, well presented and differentiated website, selling the actual product and providing a personal service was the main user/Client requirement.

### 3.2.2 Sporthorses Market Research

Sport horses have been an element of our British culture for many years. Documentation relating to sport horse breeding in the UK can be traced back to 1873 when sport horses were imported into England, primarily for the army. In 1981, the Society governing UK horse breeding changed its name to reflect the shift in demand for horses for sport and leisure. In 1998, the Society made another name change to its current title of “Sport Horse Breeding of Great Britain”. The Society grades and registers all horse breeds. The main Society objective being to produce a correct, sound, athletic sport horse with the potential to surpass in Show Jumping, Dressage or Eventing. This Society is also a Full Member of “The World Breeding Federation for Sport Horses” [46].

The recognised authorities in the Eventing sport horse world are:

- Irish Sport Horse Society
- BHS (British Horse Society)
- British Eventing
- HIS (Hunter Improvement Society)
- BSJA British Show Jumping Association
- BSPS: British Show Pony Society
- Pony’s UK: British Show Pony Society
Each horse/pony must also have a passport and vaccination certificate and be available for discretionary vetting; some may even have micro-chipped identification.

According to Oxygen Mintel: “Despite competition from other leisure activities, sport participation continues to be one of the UK’s most important pastimes, due to the trend for a healthy living”. There has been a 209% increase in computer expenditure (i.e. sale of computing equipment) in the United Kingdom (UK) over the last 10 years along with a 176% in health expenditure [47].

### 3.2.2.1 Estimated Market Value and Share

The horse industry is more varied than perhaps any other sector. The following Figure 3.12 illustrated how various parts of the industry related to each other and Table 3.3 gave an industry overview. The market is fragmented having numerous players with MSH taking a small percentage of the overall market share.

Personal research (Appendix 11) conducted on the current Client base of Moorhouse Sporthorses indicated that only 1 in 10 of MSH clients buy current stock from Moorhouse Sporthorses so potential existed even with existing customers.

![Figure 3.12 DEFRA Horse Industry Breakdown Diagram (2005) [48]](image)
Table 3.3 The British Horse Industry Federation Overview of Horse Industry [48]

<table>
<thead>
<tr>
<th><strong>OVERVIEW OF HORSE INDUSTRY BY BRITISH HORSE FEDERATION</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Output</td>
</tr>
<tr>
<td>Direct/Indirect Employees</td>
</tr>
<tr>
<td>Riders</td>
</tr>
<tr>
<td>Active Interested Industry Parties</td>
</tr>
<tr>
<td>Horse Population</td>
</tr>
<tr>
<td>Active Equestrian Businesses in UK</td>
</tr>
</tbody>
</table>

3.2.3 Internet Usage/Population Statistics

On-line success depended upon market understanding and ability to attract a target audience. Strategic decisions and web design was based upon accurate and reliable certified statistics.

Table 3.4 Internet Usage and Population Statistics [49]

<table>
<thead>
<tr>
<th>Year</th>
<th>Users</th>
<th>Population</th>
<th>% Population</th>
<th>Usage Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>15,400,000</td>
<td>58,789,194</td>
<td>26.2%</td>
<td>Nielsen Net Ratings</td>
</tr>
<tr>
<td>2005</td>
<td>35,807,929</td>
<td>59,889,407</td>
<td>59.8%</td>
<td>Nielsen Net Ratings</td>
</tr>
<tr>
<td>2008</td>
<td>38,512,837</td>
<td>60,363,602</td>
<td>63.8%</td>
<td>Nielsen Net Ratings</td>
</tr>
</tbody>
</table>

Table 3.4 showed that in 2008, nearly 64% of the UK population were internet users. Mintel research also indicated that the MSH target user mapped onto internet usage utilising predominantly a broadband connection.
Figure 3.13 shows UK population projections with a 0.7% expected increase in UK population per annum according to National Statistics. There is also an expectation that the number of people aged 65 and over will increase from 16 to 22% by 2031. It is expected this will have a positive effect on the MSH sport horse market, as a large percentage of purchasers are from the older age group, buying horses/ponies for family.

Government National statistics [51] indicated “South West and London had the highest level of increase with Yorkshire and the Humber, the North East and Northern Ireland being the lowest increase. 84% of UK households with Internet access had a broadband connection, 15% increase in the last year. London remained the highest level of increase with Northern Ireland being the lowest”.

Figure 3.14 National Statistics, Use of the Internet, 2006, GB [51]

Figure 3.14 showed National Statistic information. The internet is popular with youngsters but declines with age. In 2006 84% of 16-24 year olds used the Internet compared to 52% of 55-64 year olds. The most popular place to access the Internet for the 16s and over group is the home attracting 85% of users.
Figure 3.15 National Statistics Percentage of adult Internet users who used selected online activities in the three months before interview, 2006, GB [51]

Figure 3.15 shows the most common online activities with looking for information and using email as the most common.

Government National Statistics also indicated that 7 in 10 businesses in the UK have a website, indicating the widespread adoption of information technology. Internet Sales was £103 billion in 2005. Nearly 95% of UK small businesses in 2005 used computers with 70% of businesses possessing a website, 31% running an intranet and 8% using an extranet.

Broadband adoption, levels of connectivity and adoption have continued to grow. Figure 3.16 shows the rapid growth and changes.

Figure 3.16 UK Broadband Connections By Connection Speed [52]
Estimated Internet user penetration in the UK for 2005 – 2011 was [52]:

- 2005: 33.7 million (55.8%)
- 2006: 35.1 million (57.9%)
- 2007: 37.2 million (61.2%)
- 2008: 39.1 million (64.2%)
- 2009: 42.3 million (69.2%)
- 2010: 44.2 million (72.1%)
- 2011: 45.0 million (73.2%)

In conclusion, web analysis showed that MSH was in a good position to take advantage of this market and that their initial concerns regarding not having an Internet presence were founded as 7 in 10 UK businesses have a website. Web presence will move the company into the majority and not minority which are currently limiting their business opportunities.

### 3.2.4 Mobile Phone Usage

According to ICM Research in 2004 [53], 93% of UK computer users had a mobile phone with 27% having an internet connection and 25% having a home broadband connection. These figures act as a good comparison in how far the industry has grown over the last few years.

SMS and WAP usage, i.e. accessing the Internet from a mobile phone has become very popular [52].

Personal research 2007 (Appendix 11), discovered 100% of current target audience to have a mobile phone and 95% to be in possession of a computer with a broadband connection. However, only 80% of the current target audience are on-line users but more would consider going on line to register with the Moorhouse Sporthorses website if they provided the required service.

Research has revealed that people have more than one online device. According to Nielsen “The average Briton owns four to five digital/on line devices”, see Figure 3.17 [54].
Research also indicated that although the target audience has the technology, the majority are not ready to use it so there is no immediate urgency to develop the WAP system.

### 3.2.5 Web Browsers Display

W3C [55] recommended the following trends:

- Screen size is 1024 x 768, as over 80% of internet users now use this.

- Current colour depth trend of 24-bit or 32-bit hardware to display 16,777,216 different colours.

- 94% of users also have JavaScript turned on.

- Browser statistics show IE6 and Firefox have majority share (See Table 3.5)

- Windows family Operating System has 90% of the market (See Table 3.6)
As for Operating System Platform Statistics, Windows XP is the most popular operating system, with the windows family accounting for approximately 90% of the market.
Table 3.6 W3C OS Platform Statistics 2008 [55]

<table>
<thead>
<tr>
<th></th>
<th>WinXP</th>
<th>W2000</th>
<th>Win98</th>
<th>Vista</th>
<th>W2003</th>
<th>Linux</th>
<th>Mac</th>
</tr>
</thead>
<tbody>
<tr>
<td>February</td>
<td>72.3%</td>
<td>4.0%</td>
<td>1.0%</td>
<td>7.6%</td>
<td>1.8%</td>
<td>3.8%</td>
<td>4.3%</td>
</tr>
<tr>
<td>January</td>
<td>73.6%</td>
<td>4.0%</td>
<td>0.8%</td>
<td>7.3%</td>
<td>1.9%</td>
<td>3.6%</td>
<td>4.4%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>WinXP</th>
<th>W2000</th>
<th>Win98</th>
<th>Vista</th>
<th>W2003</th>
<th>Linux</th>
<th>Mac</th>
</tr>
</thead>
<tbody>
<tr>
<td>November</td>
<td>73.8%</td>
<td>5.1%</td>
<td>1.0%</td>
<td>6.3%</td>
<td>2.0%</td>
<td>3.3%</td>
<td>3.9%</td>
</tr>
<tr>
<td>September</td>
<td>74.3%</td>
<td>5.4%</td>
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<td>3.9%</td>
</tr>
<tr>
<td>July</td>
<td>74.6%</td>
<td>6.0%</td>
<td>0.9%</td>
<td>3.6%</td>
<td>2.0%</td>
<td>3.4%</td>
<td>4.0%</td>
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<tr>
<td>May</td>
<td>75.0%</td>
<td>6.5%</td>
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<td>March</td>
<td>76.0%</td>
<td>7.2%</td>
<td>0.9%</td>
<td>1.9%</td>
<td>1.9%</td>
<td>3.4%</td>
<td>3.8%</td>
</tr>
<tr>
<td>January</td>
<td>76.1%</td>
<td>7.7%</td>
<td>1.0%</td>
<td>0.6%</td>
<td>1.9%</td>
<td>3.6%</td>
<td>3.8%</td>
</tr>
</tbody>
</table>

3.2.6 Wireless Application Protocol (WAP) Technology

Utilising business related WAP technology is relatively a new concept [56] but one which the Client may consider. Table 3.7 shows research undertaken into the advantages and disadvantages of utilising such technology to enhance the current business system.

Table 3.7 Advantages/Disadvantages of WAP Technology for MSH

<table>
<thead>
<tr>
<th>Advantages /Disadvantages of WAP Technology for MSH</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Advantages</strong></td>
</tr>
<tr>
<td>Current target user has 100% adoption of mobile phone but not quite 100% adoption of a computer</td>
</tr>
<tr>
<td>Owner is more familiar with mobile technology than computer technology</td>
</tr>
<tr>
<td>Mobile is more portable at horse events</td>
</tr>
<tr>
<td>Mobile phone information is instantaneous and gains an immediate response</td>
</tr>
</tbody>
</table>
3.3 Summary of Analysis

Table 3.8 showed SWOT analysis, (Strengths, Weaknesses, Opportunities and Threats), of the proposed website presence. This information was utilised to turn the weaknesses into strengths and the threats into potential opportunities.

Table 3.8 SWOT Analysis Conducted on MSH Website Presence

<table>
<thead>
<tr>
<th>SWOT ANALYSIS FOR MSH WEB PRESENCE</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strengths</strong></td>
<td><strong>Weaknesses</strong></td>
</tr>
<tr>
<td>- Profitable Company</td>
<td>- Limited Marketing Opportunities</td>
</tr>
<tr>
<td>- Healthy Order Book</td>
<td>- No on-line presence</td>
</tr>
<tr>
<td>- Strong Brand</td>
<td>- Poor Customer Services</td>
</tr>
<tr>
<td>- Strategy in Place</td>
<td>- Poor business skills relating to small enterprise Situation</td>
</tr>
<tr>
<td>- Senior Management Commitment</td>
<td></td>
</tr>
<tr>
<td><strong>Opportunities</strong></td>
<td><strong>Threats</strong></td>
</tr>
<tr>
<td>- New Market</td>
<td>- New Entrants</td>
</tr>
<tr>
<td>- New Distribution Channel</td>
<td>- Regulation</td>
</tr>
<tr>
<td>- Providing added value to current customers</td>
<td>- Foot and Mouth restricting horse movement</td>
</tr>
<tr>
<td>- Cost Reductions</td>
<td>- Insurance/Liability</td>
</tr>
<tr>
<td>- Olympics/growth in Leisure Activities</td>
<td>- Changes in interest rate and disposable income less money to spend on pleasure</td>
</tr>
<tr>
<td>- Research indicates current website competition to be poor</td>
<td></td>
</tr>
</tbody>
</table>

Table 3.9 summarised general website requirements discovered by conducting thorough product, market business and user need research.

Table 3.9 Summary of Web Analysis for MSH

<table>
<thead>
<tr>
<th>MSH GENERAL WEBSITE REQUIREMENTS</th>
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</thead>
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<td><strong>No.</strong></td>
</tr>
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</tr>
<tr>
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</tr>
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<tr>
<td>12</td>
</tr>
<tr>
<td>13</td>
</tr>
</tbody>
</table>
The current systems analysis highlighted a number of weaknesses in the current business operating system. The two main elements were:

- Company survival proved extremely vulnerable, if anything were to happen to the owner, because so much information is stored with one person, valuable data would be lost and the company would not survive.
- Limited marketing ability, relying totally on very “old fashioned” methods of “word of mouth” and referrals and no advantage being taken of modern technology.

The analysis showed the key to MSH Internet success lay in the ability to develop a niche on-line market, bringing targeted users and buyers to the website, creating and building a niche user community and catering for Client need. The website would benefit from implementing new ideas and focus on a more precise target market to gain the best possible advantage from this medium.

Adoption of Systems Modelling increased project reliability and reduced development time.

The scope of the system was such that only events which occurred in the proposed system boundary were modelled i.e. the system would not directly buy or sell product because all equine products are “never” bought without being seen or tried. It was noted that e-commerce was not directly applicable to the equine world as buyers do not buy a horse on the website before riding a horse and conducting other negotiations i.e. “vetting” is a mandatory requirement. The key aim of the analysis was to summarise the problem scenario and decide upon the requirements. The key requirement for the system was to record costs of horses from purchase through to sale.

Overall research revealed that none of the researched users nor sites were satisfied with the current on-line competition of buying sport horses i.e. buying product that the user actually wanted, whilst providing a more personalised and trustworthy/accredited service.
4 SYSTEM DEVELOPMENT

The analysis phase justified the implementation of a prototype website, and highlighted the current off-line system was not entirely fulfilling the Client need. The findings and requirements in the analysis section provided key information from which to build and develop, transforming information into physical data to develop the actual software system. In this section, a number of techniques and documentation was produced to enable the successful completion of the process.

4.1 System Design

The systems design phase developed the solution, utilising models to help the process. The outcome provided detailed design documentation.

4.1.1 Data Dictionary

The data dictionary lists the structure of the data within the system, based on the Yourdon methodology [57].

The data dictionary contains table names, descriptions and fields (all under the heading of Table 4.1), to help provide consistency across the database which would support SQL queries.

Table 4.1 Data Dictionary Tables: Article / Colour / Costtype / Country / Enquiry / Enquirytype / Hitcounter / Horse / Horsecost / Horsetype / Sex / Statustype / Supplier / User / Usertype (Note: PK = Primary Key)

Table: article

<table>
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<th>Type</th>
<th>Comments</th>
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</thead>
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Table: hitcounter

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### Table: horsetype

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<th>Key</th>
<th>Name</th>
<th>Type</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>PK</td>
<td>statusTypeID</td>
<td>Integer</td>
<td>Auto inc, not null</td>
</tr>
<tr>
<td></td>
<td>statusTypeDescription</td>
<td>Varchar(20)</td>
<td>not null</td>
</tr>
</tbody>
</table>

### Table: supplier

<table>
<thead>
<tr>
<th>Key</th>
<th>Name</th>
<th>Type</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>PK</td>
<td>supplierID</td>
<td>Integer</td>
<td>Auto inc, not null</td>
</tr>
<tr>
<td></td>
<td>supplierCompanyName</td>
<td>Varchar(50)</td>
<td>not null</td>
</tr>
<tr>
<td></td>
<td>supplierFirstName</td>
<td>Varchar(20)</td>
<td>not null</td>
</tr>
<tr>
<td></td>
<td>supplierSurname</td>
<td>Varchar(50)</td>
<td>not null</td>
</tr>
<tr>
<td></td>
<td>supplierAddressStreet</td>
<td>Varchar(100)</td>
<td>not null</td>
</tr>
<tr>
<td></td>
<td>supplierAddressTownCity</td>
<td>Varchar(100)</td>
<td>not null</td>
</tr>
<tr>
<td></td>
<td>supplierAddressCounty</td>
<td>Varchar(50)</td>
<td>not null</td>
</tr>
<tr>
<td></td>
<td>supplierAddressCountryID</td>
<td>Integer</td>
<td>not null</td>
</tr>
<tr>
<td></td>
<td>supplierAddressPostCode</td>
<td>Varchar(15)</td>
<td>not null</td>
</tr>
<tr>
<td></td>
<td>supplierTelephone</td>
<td>Varchar(50)</td>
<td>not null</td>
</tr>
<tr>
<td></td>
<td>supplierFax</td>
<td>Varchar(50)</td>
<td>not null</td>
</tr>
<tr>
<td></td>
<td>supplierMobile</td>
<td>Varchar(50)</td>
<td>not null</td>
</tr>
<tr>
<td></td>
<td>supplierComments</td>
<td>Varchar(500)</td>
<td>not null</td>
</tr>
<tr>
<td></td>
<td>supplierLastUpdated</td>
<td>DateTime</td>
<td>not null</td>
</tr>
<tr>
<td></td>
<td>supplierEmailAddress</td>
<td>Varchar(255)</td>
<td>not null</td>
</tr>
</tbody>
</table>
Table: user

<table>
<thead>
<tr>
<th>Key</th>
<th>Name</th>
<th>Type</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>PK</td>
<td>userID</td>
<td>Integer</td>
<td>Auto inc, not null</td>
</tr>
<tr>
<td></td>
<td>userFirstName</td>
<td>Varchar(20)</td>
<td>not null</td>
</tr>
<tr>
<td></td>
<td>userSurname</td>
<td>Varchar(30)</td>
<td>not null</td>
</tr>
<tr>
<td></td>
<td>userAddressStreet</td>
<td>Varchar(100)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>userAddressTownCity</td>
<td>Varchar(100)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>userAddressCounty</td>
<td>Varchar(50)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>userAddressCountryID</td>
<td>Integer</td>
<td>not null</td>
</tr>
<tr>
<td></td>
<td>userAddressPostCode</td>
<td>Varchar(15)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>userTelephone</td>
<td>Varchar(50)</td>
<td>not null</td>
</tr>
<tr>
<td></td>
<td>userFax</td>
<td>Varchar(50)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>userMobile</td>
<td>Varchar(50)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>userCurrentHorseDetails</td>
<td>Varchar(512)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>userEmailAddress</td>
<td>Varchar(255)</td>
<td>not null</td>
</tr>
<tr>
<td></td>
<td>userLoginPassword</td>
<td>Varchar(10)</td>
<td>not null</td>
</tr>
<tr>
<td></td>
<td>userCompanyName</td>
<td>Varchar(50)</td>
<td></td>
</tr>
</tbody>
</table>

Table: usertype

<table>
<thead>
<tr>
<th>Key</th>
<th>Name</th>
<th>Type</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>PK</td>
<td>userTypeID</td>
<td>Integer</td>
<td>Auto inc, not null</td>
</tr>
<tr>
<td></td>
<td>userTypeDescription</td>
<td>Varchar(40)</td>
<td>not null</td>
</tr>
</tbody>
</table>

4.1.2 Hardware/Software Requirements

The MSH System is a 3-tier database-driven web-based system. Consequently, the three key platforms in the MSH system were the Client Web Browser, PHP running on a web server and MySQL running on a database server. To enable the live MSH website environment, the points in Table 4.2 were required:
Table 4.2 Client Web Browser/PHP/MySQL Hardware and Software [58]

<table>
<thead>
<tr>
<th>Type</th>
<th>Hardware</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Client Web Browser</strong></td>
<td>486/66 MHz or Higher Processor, 32 Mb RAM Minimum, 16-Bit Video Card/Display</td>
<td>Internet Explorer V6.x, or later / FireFox V2.x or later</td>
</tr>
<tr>
<td><strong>Web Server and PHP</strong></td>
<td>Hardware to run required operating system</td>
<td>• 32-Bit Operating System (Unix, Linux, Windows NT4 and above)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Apache, IIS or any other supported web server</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• PHP 5+, GD image library required for dynamic image resizing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Diskspace used: 250Kb for scripts + CSS. JPGs for horse images will be the main usage, expected at about 3-4Mb per horse image.</td>
</tr>
<tr>
<td><strong>Database Server</strong></td>
<td>Hardware to run required operating system</td>
<td>• Operating System (Unix Linux, MS Windows etc)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• MySQL 5+ Database Size: 250Kb</td>
</tr>
</tbody>
</table>

The MSH website has been developed on a standard Windows XP SP2 PC (Dell 3GHz 1Gb RAM, 250Gb Hard Disk) running all 3-tiers simultaneously Internet Explorer V6, IIS 5+PHP5 and MySQL5.

The main software tools used during the development were Dreamweaver, PhotoShop and MySQL Administrator.

Note: since the website deployment environment is controlled by Telivo (the chosen ISP), the exact configuration of hardware / software at Telivo is unknown, and may change frequently due to “server farm” and “load balance” requirements.

The prototype was designed using PHP as a server-side scripting language and JavaScript for client-side scripting such as the date. PHP was chosen because it was a free, industry proven open source software with cross-platform capabilities, having the ability to run on almost any operating system.
PHP interacts easily with databases, files and email. It was also better, faster and easier to learn than its competition. The use of PHP gave the prototype a dynamic behaviour to fulfil user requirements. MySQL Administrator was used as the DBMS front-end which was an excellent tool for learning Structured Query Language (SQL). Figure 4.1 shows an Event Interaction in the Client Server Model.

![Client Server Model (With An Event Interaction)](image)

Constraints related to the fact that there was no financial budget for this project so free industrial standard software had to be chosen.

**4.2 Database Design**

The process of producing a data model for a database is known as database design. In the relational model [60], the logical database design related to the tables. Design also referred to the queries used as part of the overall database application in the DBMS.

This section explained the performance of the proposed system and provided models to demonstrate expected functionality.
4.2.1 The Three Tier Architecture

Figure 4.2 related to the three layers of architecture applied to MSH.

MySQL is an open-source Database Management System (DBMS), closely linked with the use of PHP. It is a highly scalable DBMS which can handle large quantities of data and is ideal for the MSH application.

MySQL GUI tools, namely MySQL Administrator and MySQL Query Browser were used to administer the MySQL database. In addition PHPMyAdmin was used, a free software web based administration interface implemented in PHP. SQL commands and queries are executed by establishing a database connection. The above 3-Tier Architecture provides a scalable and flexible multi-concurrent system.

All tables are located in a single database. The first step was to identify and design the tables, specify contents and define relationships between them.
### 4.2.3 Entity Relationship Diagrams (ERD)

This diagram was produced in close association with the environmental modelling diagrams as stated in 3.1.3 and 3.1.4 i.e. Context Diagram and Events List. The ERD, Figure 4.3, showed the objects and relationships.

Considerable time was spent on building the system model to ensure the system satisfied with user requirements and was then carefully reviewed and agreed with all key personnel involved in the project.

Figure 4.3 MSH Entity Relationship Diagram

**ERD Footnote:** There is no data relationship or dependency between hitcounter and any other entity in the system. This is also true for article entity, as information is currently stored independent of any other field such as a userID. This conforms to Client requirement. (Appendix 3).
4.3 Web Design

The project followed a systematic approach to web design using the User Centred Web Development (UCWD) Methodology [31] with a view to defining the target user to successfully meet user requirement i.e. to look at user characteristics and requirements: Who the users are? What the users want? What Computer experience users have? What Computing environment users possess? The results helped to formulate and shape the eventual web design.

The Usability Life Cycle approach adopted the following stages [31]:

- Define Mission,
- Collect User Requirements
- Create Conceptual Design
- Create Physical Design,
- Perform Usability Testing
- Implementation,
- Evaluate and improve

As a note, the life cycle would normally include website marketing however it was agreed this was out of the scope of this project.

4.3.1 Mission

The first stage in the UCWD [31] process was to define the Company Mission, an important factor to provide structure for the project web design scope, defining the focus of the website. If user need was not considered, the Client organisation and reputation would be damaged [61], so considerable time was spent with the Client and their customers to ascertain the requirements.

MSH Mission Statement was:

“To provide a unique and personal customer service to customers wishing to buy and sell horses and ponies”. [62]
### 4.3.2 User Requirements

Accordingly to UCWD methodology [31], defining target user population would develop a successful site as user need cannot be met if user is unknown [63].

#### 4.3.2.1 Target User

Figure 4.4 shows an analysis of the MSH target user. Information was taken from personal research, company information and previous company sales figures supplied by the Client. The findings were also mapped on to the current Internet Usage/Population Statistics, from Section 3 Figure 3.4 to determine on-line users.

<table>
<thead>
<tr>
<th>ANALYSIS OF MSH TARGET USER:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age/Technical Ability</strong></td>
</tr>
<tr>
<td>• Heavy Users: 16 – 55, competent computer users</td>
</tr>
<tr>
<td>• Medium Users: 55 – 75+, competent computer users</td>
</tr>
<tr>
<td>• Light Users: 10 – 15, competent computer users</td>
</tr>
<tr>
<td><strong>Gender/Disability</strong></td>
</tr>
<tr>
<td>• Split Evenly between Male/Female</td>
</tr>
<tr>
<td>• (Slight bias to women for transactions and men for using Internet.).</td>
</tr>
<tr>
<td><strong>Geographic Location</strong></td>
</tr>
<tr>
<td>• Heavy Users: Scotland and Southern Ireland,</td>
</tr>
<tr>
<td>• Medium Users: London, North East &amp; West Midlands.</td>
</tr>
<tr>
<td>• Light Users: The North Wales and North West</td>
</tr>
<tr>
<td><strong>Residence: Urban, Suburban, and Rural</strong></td>
</tr>
<tr>
<td>• Heavy Users: Household residence 3 - 4 persons,</td>
</tr>
<tr>
<td>• Medium Users: Household residence 2 persons,</td>
</tr>
<tr>
<td>• Light Users: 55+, 2 persons and under.</td>
</tr>
<tr>
<td><strong>Income/Level of Education</strong></td>
</tr>
<tr>
<td>• Heavy Users: ABC1 full-time workers (med/high education)</td>
</tr>
<tr>
<td>• Medium Users: C2 full/part-time workers (med/high education)</td>
</tr>
<tr>
<td>• Light Users: DE, elderly, retired</td>
</tr>
<tr>
<td><strong>Culture, Race or Ethnicity</strong></td>
</tr>
<tr>
<td>• Heavy User: British white</td>
</tr>
<tr>
<td><strong>Interests/Background</strong></td>
</tr>
<tr>
<td>• Heavy Users: Unmarried or married, employed, single or couples</td>
</tr>
<tr>
<td>Pre-family/youngsters 20 – 45, have broadband Internet Connection, spend 4+ hours on a computer (work and pleasure)/own mobile phone, read horse literature/use Internet to find equestrian products, send/receive emails, use search engines, and have PDI (Personal Disposable Income)</td>
</tr>
<tr>
<td>• Medium Users: Married work full time ≤ 2 children, older post-family high income</td>
</tr>
<tr>
<td>• Light Users: Older, post-family people with little income</td>
</tr>
</tbody>
</table>
### 4.3.2.2 Personas

Personas were used as part of the Rapid User Modelling Method (RUMM) methodology [32] to get a feel for the typical user of the website, Figures 4.5/4.6.

**MSH Persona Number 1**

<table>
<thead>
<tr>
<th>Name:</th>
<th>Christopher Brown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age/Marital Status:</td>
<td>29 years old, Single, no children</td>
</tr>
<tr>
<td>Location:</td>
<td>Owns 4 bedroomed house in Chop Gate, England</td>
</tr>
<tr>
<td>Profession:</td>
<td>Farrier</td>
</tr>
<tr>
<td>Computer:</td>
<td>Computer literate, using variety of software/activities</td>
</tr>
<tr>
<td>Experience</td>
<td>Uses everyday for both work and pleasure to send/receive emails, surf the net, buy on line (including ebay), and explore his leisure interests especially play station games. At home, reads Horse and Hound magazine. He has a high spec modern computer with 21” flat screen, high speed broadband internet connection with satellite television. He owns a mobile and enjoys the computer possessing reasonable typing skills, but has a distinct dislike for unnecessary pollution i.e. pop-ups etc.</td>
</tr>
<tr>
<td>Interests:</td>
<td>Christopher has always been interested in Horses and loved playing computer games as a child. Both his parents can use a computer but do not use computers for their jobs. He likes listening and downloading music but spends most of his time with horses, going hunting and attending social events within the equestrian world.</td>
</tr>
<tr>
<td>General:</td>
<td>His passion for horses led to becoming a professional farrier. He has lived in the North East of England all his life and has no intention to move. He is hoping to progress his riding ambition to enter more competitions in both the Show Jumping and Eventing fields and improve his overall ranking. He has no disabilities; however, may perhaps be slightly dyslexic. He has bought stock from the owner before but has also purchased horses using Internet websites such as Horse Quest. The main drawback is that there is no facility to register details and for the company to email him when something matches his requirements. He would be interested to find out more useful information about Moorhouse Sporthorses and would be willing to register with the company to potentially buy and sell horses.</td>
</tr>
</tbody>
</table>

Figure 4.5 MSH Persona Number 1
<table>
<thead>
<tr>
<th>MSH Persona Number 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name:</strong> Jane Grey</td>
</tr>
<tr>
<td><strong>Age/ Marital Status:</strong> 45 years old, Widowed, two children</td>
</tr>
<tr>
<td><strong>Location:</strong> Lives in own 6 bedroomed country residence in Hawick. Both children are now married with their own children.</td>
</tr>
<tr>
<td><strong>Profession:</strong> Professional Horse Lady</td>
</tr>
<tr>
<td><strong>Computer</strong></td>
</tr>
<tr>
<td>Is able to use a computer and has purchased a relatively new laptop because of its portability factor. However, only uses it infrequently.</td>
</tr>
<tr>
<td><strong>Experience</strong></td>
</tr>
<tr>
<td>She uses the computer to send/receive emails, buy equine products, basic bookkeeping and letter writing. She uses search engines (preference Google) and has an MSN Messenger email account. She has a high speed Broadband Internet Connection but spends almost all of her day with horses or family. She occasionally surfs the internet on an evening for leisure. Jane has average typing skills.</td>
</tr>
<tr>
<td><strong>Interests:</strong> Jane's major passion is horses and anything to do with horses. Her social activities are all evolved around horses and her family are also employed and own farms in the countryside pursuits. She enjoys watching polo and gardening when she gets the chance. She loves cooking and prefers her own home cooked food to any packet. She does not watch TV but prefers to read or listen to music. She does however enjoy going to the cinema.</td>
</tr>
<tr>
<td><strong>General:</strong> Jane is dedicated to horses and one of her daughters rides for the British Evening Team. She travels around the country on a regular basis to attend various events. She helps both her children and grandchildren and buys horses and ponies for them. Although an excellent rider herself, mainly in the showing and side saddle categories, she spends more time grooming and preparing horses for her family to ride. Jane has never bought a horse or pony from the Internet as she does not trust the media, however, has bought a large number of ponies and horses from Moorhouse Sporthorses.</td>
</tr>
</tbody>
</table>

Figure 4.6 MSH Persona Number 2
4.3.2.3 Current User Method of Purchase/Information Seek

Personal research (Appendix 11) showed that the potential target user(s) found information and purchase horses and ponies from the following sources:

- Specialist Magazines/periodicals
- Television/Satellite etc
- DVDs
- Internet Search Facilities
- Internet Websites specific to horse/pony sales
- Horse Shows
- Daily Newspapers
- Auctions/Private Sales

4.3.2.4 Utilising RUMM Version 2

The following documents were completed, as part of the RUMM methodology identified in Section 2. The information gained would help to determine and analyse user requirements with a view to producing a suitable and user appropriate prototype:

- Actors and Tasks List (Table 4.4)
- Lists of Tasks/Applications/Functions/Features (Example Table 4.5)
- RUMM Design Considerations: Navigation, Layout, Content/Theme/Metaphors, Colours and Accessibility (Example Table 4.5)
- RUMM Methodology Applied To An Actor (Example Table 4.11)

Table 4.3 listed all the users in the system i.e. Actors, along with their tasks. The Table specifically showed functionality for each user level.
Table 4.3 RUMM Actors and Tasks in MSH System

<table>
<thead>
<tr>
<th>Actor</th>
<th>Task</th>
</tr>
</thead>
</table>
| Any Public User (Not logged in)      | • View Homepage (including News and Horse Of the Month)  
• View Accessibility  
• View Sitemap  
• View Testimonials  
• View Contact Us (just address / contact details)  
• View/Search Gallery showing horse thumbnail and subset of total horse details  
• View Disclaimer/Copyright  
• View Help  
• View Privacy Statement  
• Register User/Create New Profile  
• Login  
•Forgot Password (Send Password Reminder) |
|Registered User (Logged In)          | • (previous features)+  
• More horse details including viewing full-size horse images  
• Make Basic General Enquiry  
• Express Interest on a Specific Horse from the Gallery  
• Upload a Horse for Sale  
• Edit profile information  
• View profile information  
• Logout |
| MSH Non-Management Staff (Logged In) | • (previous features)+  
• Add horse costs to a specific horse e.g. training, vet's bills etc |
| MSH Management Staff (Logged In)     | • (previous features)+  
• View Gallery (with extra Approval Status Filter option allowing viewing of non-approved horses)  
• View Admin Menu  
  - Manage Enquiries (update status of the three types of enquiries)  
  - Manage Suppliers (add/edit/delete)  
  - Manage Users (add/edit)  
  - View Management Cost Report (showing profit/loss on horses)  
  - View Full Horse Details including Bought and Sold details  
  - Add/Edit Any Horse and amend all details, including changing approval status of a horse, changing horse of month status, show price status  
• View Hitcounter |

Table 4.4 drilled-down from the task list above and provided detailed tasks with associated functions and features which the prototype was expected to achieve.
Table 4.5 RUMM Design Considerations: Navigation

Composite.
given to the four main types of navigation i.e. Linear, Non-Linear, Hierarchical and design considerations in relation to the Navigation element. Consideration was Tables 4.5 to 4.9 documented user interface criteria, Table 4.5 documented
design considerations in relation to the Navigation element. Consideration was
given to the four main types of navigation i.e. Linear, Non-Linear, Hierarchical and Composite.

Table 4.5 RUMM Design Considerations: Navigation

<table>
<thead>
<tr>
<th>Task</th>
<th>Must consider the following:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registration</td>
<td>Clear links from admin area, once registration has taken place, the actor must be taken back to the home page.</td>
</tr>
<tr>
<td>Login</td>
<td>Login form should be main part of home page. Once logged in, login form shows user name to indicate that task is complete.</td>
</tr>
<tr>
<td>Amend Details</td>
<td>Simple and quick mechanism to edit form and submit new information. System should provide feedback on successful completion of task. Ability to clear details if mistakes are made and use of JavaScript if a compulsory field is not completed</td>
</tr>
<tr>
<td>Search for a Horse</td>
<td>Mechanism to find a specific horse based on specific criteria via a simple drop down menu</td>
</tr>
<tr>
<td>Site Map</td>
<td>Provided so all users are aware of site layout.</td>
</tr>
<tr>
<td>Main Navigation</td>
<td>Obvious Navigational elements, pointer changes to a hand to indicate interaction.</td>
</tr>
</tbody>
</table>
Table 4.6 documented design considerations in relation to the Layout element.

Table 4.6 RUMM Design Considerations: Layout

<table>
<thead>
<tr>
<th>Layout Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task</td>
</tr>
<tr>
<td>Registration</td>
</tr>
<tr>
<td>Login</td>
</tr>
<tr>
<td>All generated pages</td>
</tr>
<tr>
<td>Main Navigation</td>
</tr>
</tbody>
</table>

A cascading stylesheet (CSS) was used to improve developer efficiency, control to obtain precise visual design throughout the site, see Figure 4.7.

Figure 4.7 CSS Controlling Web pages [64]

Page design closely followed recommended codes of practice from gurus such as Schneiderman [65] and Jakob Nielsen [66]. Page “real estate” was considered to give maximum impact. [67].

Of particular note is the positioning of MSH website title, primary navigation and login box, as Jakob Nielsen advocates this to be the most prominent place for important information [68].

The top ten mistakes [69] in web design were also adhered to following the information in Table 4.7.
Table 4.7 Jakob Nielsen Top 10 Mistakes in Web Design (2005)

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Legibility Problems</td>
</tr>
<tr>
<td>2</td>
<td>Non-Standard Links</td>
</tr>
<tr>
<td>3</td>
<td>Flash</td>
</tr>
<tr>
<td>4</td>
<td>Non-Standard Links</td>
</tr>
<tr>
<td>5</td>
<td>Bad Search</td>
</tr>
<tr>
<td>6</td>
<td>Non-Standard Links</td>
</tr>
<tr>
<td>7</td>
<td>Cumbersome Forms</td>
</tr>
<tr>
<td>8</td>
<td>No Contact Information or Other Company Info</td>
</tr>
<tr>
<td>9</td>
<td>Frozen layouts with fixed page widths</td>
</tr>
<tr>
<td>10</td>
<td>Inadequate Photo Enlargement</td>
</tr>
</tbody>
</table>

User interface design also followed the four basic P.A.R.C. principles [70]:

- Proximity
- Alignment
- Repetition
- Contrast

Table 4.8 documented design considerations in relation to the Content/Theme/Metaphor elements.

Table 4.8 RUMM Design Considerations: Content/Theme/Metaphors [71]

<table>
<thead>
<tr>
<th>Content/Theme/Metaphors Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task</td>
</tr>
<tr>
<td>Registration</td>
</tr>
<tr>
<td>Login</td>
</tr>
<tr>
<td>All generated pages</td>
</tr>
<tr>
<td>Main Navigation</td>
</tr>
</tbody>
</table>
Figure 4.8 shows obvious metaphors used to aid site design and screen real estate, being appropriate for all classes of site user.

Table 4.9 documented design considerations in relation to the Colour element.

Table 4.9 RUMM Design Considerations: Colour

<table>
<thead>
<tr>
<th>Colour Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Task</strong></td>
</tr>
<tr>
<td>Registration</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Login</td>
</tr>
<tr>
<td>All generated pages</td>
</tr>
<tr>
<td>Main Navigation</td>
</tr>
</tbody>
</table>

Figure 4.9 showed a colour wheel, one of the determinants to help choose website colours.
Table 4.10 documented Accessibility considerations [74], with consideration given to key business accessibility reasons:

- Gain competitive advantage
- Ensure most effective use of Website
- Enhance reputation
- Limit liability of being sued
- Conform to legislation [75] i.e. DDA (1995)

Table 4.10 RUMM Design Considerations: Accessibility

<table>
<thead>
<tr>
<th>Accessibility Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task</td>
</tr>
<tr>
<td>Registration</td>
</tr>
<tr>
<td>Login</td>
</tr>
<tr>
<td>All generated pages</td>
</tr>
<tr>
<td>Main Navigation</td>
</tr>
<tr>
<td>Overall Design</td>
</tr>
</tbody>
</table>

Table 4.11 shows an example of the RUMM Methodology applied to a specific actor i.e. an Administrator.

Information was completed for each Actor in the system in order to understand both actor competency and functionality.

The actors were summarised in Figure 4.9, MSH System Actors and Tasks.
<table>
<thead>
<tr>
<th>Actor Name:</th>
<th>Administrator</th>
<th>Actor Importance:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>High</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[√]</td>
</tr>
</tbody>
</table>

**Summary Description Of Actor:** The owner/webmaster/administrator of website will have complete website control from conception/creation/design to implementation. Having control over data driven elements, control of login names and details.

**Complete Actor Profile (If applicable)**

<table>
<thead>
<tr>
<th>Age:</th>
<th>Children – KS 0 (0-4 yrs)</th>
<th>[ ]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Children – KS 1 (4-7 yrs)</td>
<td>[ ]</td>
</tr>
<tr>
<td></td>
<td>Children – KS 2 (7-11 yrs)</td>
<td>[ ]</td>
</tr>
<tr>
<td></td>
<td>Children – KS 3 (11-14 yrs)</td>
<td>[ ]</td>
</tr>
<tr>
<td></td>
<td>Children – KS 4 (14-16 yrs)</td>
<td>[ ]</td>
</tr>
<tr>
<td></td>
<td>Adults (17-30)</td>
<td>[ ]</td>
</tr>
<tr>
<td></td>
<td>Adults (30-50)</td>
<td>[√]</td>
</tr>
<tr>
<td></td>
<td>Adults (50+)</td>
<td>[√]</td>
</tr>
</tbody>
</table>

**Gender:** Male [ ] Female [ ] Both [√]

**I.T. Literacy Level:** Novice [ ] Intermediate [ ] Expert [√]

**Web Usage Habits:**
- Email [√]
- Shopping [√]
- Purchasing Goods [√]
- Entertainment [√]
- Learning [√]
- Content Developer [√]
- Data Input [√]
- Information Gathering [√]

**If this application will replace a previous version, please complete this section**
- Offline Only [ ] Online [ ] Mobile [ ]
- Online/Mobile Hybrid [ ]
- Other: N/A

**Actor Traits (tick all that applies)**
- Time Poor [√]
- Time Rich [ ]
- Likes To Explore [√]
- Likes To Access Information Quickly [√]
- Needs Assistance To Complete A Task [ ]
- Needs A Little Help To Complete A Task [ ]
- Works Remotely [√]

**Actor Completes The Following Tasks Within The Application**
1. Edit Site Content
2. Input Site Content
3. System registration
4. Login
5. Search for old content
6. Upload content
7. Main Navigation
8. View Website
9. Create New Personal Profile
10. Edit Personal Profile
11. Remove Personal Profile
A simplified diagram of the 3 basic users in the system and user permissions can be seen in Figure 4.9. Each other above each other inherit all functionality from the user below plus their own additional functionality.

![MSH System Actors/Tasks](image)

**Figure 4.9 MSH System Actors/Tasks**

### 4.3.2.5 Visual Map

The Client and a focus group of the Client’s website users were given a visual mapping exercise (Appendix 12) to determine: website competitor effectiveness and MSH website expectation. The findings were used to help design the MSH website.

The Client and user were asked to list the likes and dislikes of each. In summary, no website was classified as “particularly inspiring”.
Table 4.12 summarised the main likes and dislikes.

Table 4.12 Summary of Visual Mapping Exercise on MSH On-line Competition Main Likes/Dislikes

<table>
<thead>
<tr>
<th>Likes</th>
<th>Dislikes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. White Background</td>
<td>1. Too much information/text too small</td>
</tr>
<tr>
<td>2. Quick loading pages</td>
<td>2. No differentiation</td>
</tr>
<tr>
<td>3. Good well displayed images</td>
<td>3. Poor contrast Backgrounds</td>
</tr>
<tr>
<td>5. Registered Users Page</td>
<td>5. Flashing/moving images</td>
</tr>
</tbody>
</table>

Figure 4.10 looked at the major on-line niche competitors and compared the websites.

The method and process of this exercise proved appropriate for this Client as their on-line experience was limited. By using a very visual method, the owner and target users were able to convey website requirements quickly and effectively.
4.3.3 Conceptual Design

Figure 4.11 identified the elements the Client considered to be required on the home page of the prototype website.

4.3.4 Web Designer Specification

In addition to items identified by the user, the following important points were considered by the designer:

- Website to conform to MSH Marketing/Internet Marketing Strategy
- Website to provide information only – no on-line sales
- Variety of useful and updated information to keep the website interesting and appealing.
- Comply to legal/social/data protection/moral and indecency/www.3.org Priority 1 Standards as a minimum requirement [77]
- Unique Selling Point (reason for users to visit site) i.e. only site that provides users with a search and find service for their horses/ponies.
- Useful Links/Sponsored links to increase site traffic
- Readable Fonts appropriate to target market
4.3.5 Creative Influences

The design was conceived from:

- Equestrian Events/Google/Adverts
- Talking to the target user group
- Market Research + Viewing/evaluating competitors’ websites [78]
- The Golden Section i.e. use of rectangles to draw user’s attention [79]
- Colour palettes suitable for target user group
- Looking at the overall concept of horses i.e. outdoor, look-and-feel / Moodboard
- Commercial websites such as BBC [80] which appeal to a wide target audience, which are functional, provide a plenitude of information
- The simplistic design was taken from the Google home page website [81].
- Inspiration for the whole site came from the following phrase: “Less is more” i.e. to provide the user with something which they want, a site which sells horses/ponies not over-powered by everything else.
- Content inspiration came from extensive market research, especially concerning the inclusion of owner/user requirements (Appendix 11)
- “The Works” website [82] gave colour inspiration, headings, text size, depicted complimentary colours of black, grey and blue.

4.3.5.1 Web Storyboards

Storyboarding was part of the stages of good authoring, see Figure 4.12 for main page layout and 4.13 as an example of gallery page design. Storyboards show the exact layout of the default screen and how generally all screens use the same layout with a banner, navigation bar, login box, information area and footer, all pages following template design for uniformity across the site.
**Storyboard for MSH**

**Client Name:** Moorhouse Sporthorses  
**Project Title:** Final Year Project: MSH Prototype Website  
**Last Update:** 13 November 2007  
**Name of Designer:** Mrs C Moorhouse  
**Panel/Page ID:** Home/Entry Page  
**Panel/Page/Frame No:** Home/Entry Page

**Description:** This page is the default/index entry/home page for the website. The page will act as a template for all other pages, possessing the same navigation, style, font, colours etc throughout the site. The site is generated using PHP files, providing dynamic content. Cascading Style Sheet (CSS) was used for uniformity across site.

**User Interactions:** Users can choose where they wish to go in the site by simple/known text-based navigation (user friendly). Cursor changes when active element pointed to. All active links conform to standard linking design with words underline and a change in colour for the hover CSS style. JavaScript has been incorporated for time/date function.

**Graphics/Interface Design:** All original artwork produced for MSH i.e. website logos. All horse images supplied by MSH, software used included Adobe Photoshop 8 and Illustrator.

**Audio/Video:** No audio or video at present moment in time

**Text:**  
Font family: Verdana, Arial, Helvetica, sans-serif  
10pt body text

**Colour Specs:**  
Black (#000000), White (#ffffff), Grey (#eeeeee), Blue (#000066)  
(#0000cc) (See Colour Pallet).  
Background of site predominantly white, occasional use of blue with white text to add emphasis and grey background (#dddddd).

**Panel Layout Sketch (Designed for 1024 x 768)**

- All Navigation links created using text only (standard notation using underline: link/visited/hover – change colour)  
- Date and Time: Run Clock Function from JavaScript

Outline horse image, designed using Photoshop, aesthetic to balance white space

2 fields email, password and forgotten password link to send email

Image generated from database (most recent)

Current news items generated from database allowing user to chose all/few

---

Figure 4.12 Storyboard for MSH, Home Page
**Storyboard for MSH**

**Client Name/Project Title:** Moorhouse Sporthorses : Prototype Website

**Date:** 13 November 2007  
**Name of Designer:** Mrs C Moorhouse

**Panel/Page ID:** Gallery Page (Registered User)

**Description:** This page is the gallery page, showing images of all horses and ponies for sale, plus text details. The page follows the same basic layout as the home page with only the central part of the page differing in content i.e. same colours, fonts, navigation, feel etc. The page is dynamically generated from a database. Cascading Style Sheet (CSS) was used for uniformity across site.

**User Interactions:** Users can choose where they wish to go in the site by simple/known text-based navigation (user friendly). Cursor changes when active element pointed to. All active links conform to standard linking design with words underline and a change in colour for the hover CSS style. Javascript has been incorporated for time/date function. Search facility given based on colour and type. Users can look at more details, larger images or express an interest in the product.

**Graphics/Design:** All original logo artwork produced for MSH. Horse images supplied by MSH, software used included Adobe Photoshop 8 and Illustrator.

**Audio/Video:** No audio or video at present moment in time

**Text:** Font family: Verdana, Arial, Helvetica, sans-serif 10pt body text

**Colour Specs:** Black (#000000), White (#ffffff), Grey (#eeeeee), Blue (#000066) (#0000cc) (See Colour Pallet). Background white, occasional use of blue with white text to add emphasis and grey background (#dddddd).

**Panel Layout Sketch (Designed for 1024 x 768)**

- All Navigation links created using text only (standard notation using underline: link/visited/hover – change colour)
- Date and Time: Run Clock Function from JavaScript
- Images generated from database
- Text data related to image taken from database
- Click on link to display more information
- Login Box Showing Current User Name
- Marketing Image
- Search Facility: Dynamic content making up a Gallery of Horses/Ponies
- Text and Graphics (Inserted within the body)
- Images
- Text
- Link: More Details
- Link: Express Interest
- Footer: Secondary Navigation
- Click on link to go to Express Interest to add price or send comments
- Line aesthetic, there only to break up information, to go to next image

Figure 4.13 Storyboard for MSH Gallery Page
4.3.5.2 Colour Palette

Production of a well contrasted and legible design was stated as a Client requirement. The colour palette, Figure 4.14, would enable contrasting colours to be chosen, along with documented guidelines so the website colour remained consistent throughout [83]. Consideration was also taken to the age, gender and culture of the target audience before colours were identified. See Table 4.9 RUMM Design Considerations, for further details.

<table>
<thead>
<tr>
<th>COLOUR PALETTE FOR MOORHOUSE SPORTHORSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEXT</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>BACKGROUND</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Figure 4.14 MSH Colour Palette

4.3.5.3 Moodboard

Whilst functionality is important, research also supported that it was just as important to fulfil visual appeal [84].

Figure 4.15 showed MSH moodboard to depict the look and feel of the industry to gain a better understanding of the equestrian industry.
4.3.6 First Design Sketch

Figure 4.16 was the first interpretation i.e. home page screen dump, design in Dreamweaver of the requirements given to MSH for discussion.
4.3.7 Navigation Chart

Figure 4.17 MSH Navigation Chart
Figure 4.17 shows the proposed navigation based on Composite Navigation. This was chosen as the most suitable so the target user could explore the site adhoc in the majority of the pages, yet will be limited to follow a structure in other areas such as “register”.

4.4 Logo Design

Section 1, Table 1.2 MSH Project Deliverables, identified a corporate logo to be a requirement. Further to meetings with the Client, the following criteria were outlined in Table 4.13.

Table 4.13 MSH Criteria for Logo Design

<table>
<thead>
<tr>
<th>MSH CRITERIA FOR LOGO DESIGN</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Logo to portray current company image but also be able to move the company forward</td>
<td></td>
</tr>
<tr>
<td>2 Use of corporate colours: blue and white</td>
<td></td>
</tr>
<tr>
<td>3 Simple, immediately recognisable logo</td>
<td></td>
</tr>
<tr>
<td>4 Logo to be used throughout the company, one which can be adapted/transferable to other forms of media e.g. horsebox graphics, equestrian products i.e. clothing/rugs, stationery, and the website</td>
<td></td>
</tr>
<tr>
<td>5 Preference for outline design and jumping active horse</td>
<td></td>
</tr>
</tbody>
</table>

Inspirational ideas were taken from a variety of on-line images and sources [85]. The company agreed the following artwork, seen in Figure 4.13, copy artwork in Appendix 18. This was an original design for the company using Illustrator and edited in Adobe Photoshop.

<table>
<thead>
<tr>
<th>MSH AGREED ARTWORK FOR COMPANY LOGO</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Logo artwork was designed initially for the holding page.</td>
<td></td>
</tr>
<tr>
<td>Agreed horse outline artwork</td>
<td></td>
</tr>
<tr>
<td>Once company logo agreed, artwork modified for website/holding page, company stationery etc</td>
<td></td>
</tr>
</tbody>
</table>

Figure 4.18 MSH Agreed Artwork for Company Logo
4.5 Summary

Discussion took place with all personnel relevant to the proposed website i.e. the Client, the customer, potential customers, company staff and administration.

Conclusion of research revealed target users were not satisfied with current online services offered by competition and believed there was an opening in the market to provide a website dedicated to the specific buying and selling of horses and ponies. This was believed to be an excellent unique selling point for the MSH website.

Completion of the analysis provided a detailed overview, from which a list of user requirements was obtained, as can be seen in Table 4.14.

Table 4.14 MSH List of User Website Requirements

<table>
<thead>
<tr>
<th>No</th>
<th>User Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Obvious Home Page</td>
</tr>
<tr>
<td>2</td>
<td>Intuitive/User Friendly/Easy to use/Predictable/Effortless to use, learn and understand, technology that fits both purpose and all users</td>
</tr>
<tr>
<td>3</td>
<td>Clear, plenty of white space, not too busy/cluttered</td>
</tr>
<tr>
<td>4</td>
<td>Audience appropriate content, suitable for sport horse buyers and sellers, plenty of interesting content i.e. gallery, graphics, words, colours, age, gender, computer experience (User Centered Website)</td>
</tr>
<tr>
<td>5</td>
<td>Good contrast of colours (background/foreground/images)</td>
</tr>
<tr>
<td>6</td>
<td>Legible Text</td>
</tr>
<tr>
<td>7</td>
<td>No distracting information e.g. pop ups</td>
</tr>
<tr>
<td>8</td>
<td>Uniformity of navigation/style/layout</td>
</tr>
<tr>
<td>9</td>
<td>Search facility</td>
</tr>
<tr>
<td>10</td>
<td>Aesthetically pleasing, good balance between graphics and text</td>
</tr>
<tr>
<td>11</td>
<td>Interesting/innovative</td>
</tr>
<tr>
<td>12</td>
<td>Minimal download time</td>
</tr>
<tr>
<td>13</td>
<td>Accessible website conforming to guidelines and legislation</td>
</tr>
<tr>
<td>14</td>
<td>Easy maintenance website</td>
</tr>
<tr>
<td>15</td>
<td>Members login area</td>
</tr>
</tbody>
</table>

The importance of interface design was seen as a key issue as the user needs to be able to enter and navigate the site easily, “feel happy” when using the site. The site must reflect the company image and users must have a reason to return, “Sticky Elements”. Web loyalty is different with a competitor only one click away.

This was then the basis for how and why implementation was carried out, with each requirement being addressed in the next section, Implementation.
5 SYSTEM IMPLEMENTATION

Following the completion of the analysis and design stages, all information was combined to help system implementation.

This phase was undertaken utilising appropriate tools, technologies and findings from the overall analysis. Prototyping was also used following the agreed methodology.

Figure 5.1 shows an overview of elements required to implement the website.

![Webpage Layout/Implementation Diagram]

Figure 5.1 Webpage Layout/Implementation [86]

5.1 Physical Implementation

Physical implementation related to how the information system would be physically implemented to meet logical requirements, this involved production of technical documentation to enable the logical design specification to be implemented. The hardware and software elements were discussed in Section 4.
5.1.1 Physical File Structure

Figure 5.2 shows the actual organisation of the website structure including files, folders and Asset Register.

- **/php** refers to the list of PHP files
- **/styles** contains the website CSS stylesheet
- **/js** is the JavaScript file (clock, e-mail validation pop-up)
- **/images** contains the website asset register and images

A copy of all PHP source code files is included in Appendix 15.
Figure 5.3 shows screen dump of MSH Asset Register and current horses’ folder. Appendix 16 is a hard copy of CSS Stylesheet, Javascript Code, Asset Register and Images.

Figure 5.4 shows a selection of horses added to the horses’ folder for test data purposes. The pictures were numbered automatically in the database starting at 1.jpg and incrementing by 1 when a new picture was added.
### 5.1.2 CSS Style Sheet

MSH prototype has used a cascading stylesheet to provide consistent formatting, accessibility and usability throughout the site. CSS is simply a mechanism to add style such as font, colours and spacing to web documents [87]. Selections of examples are shown in Figure 5.5 of CSS in operation within the website:

```css
.mshHeadingMain
{
    colour: #000066;
    font-weight: bolder;
    font-size: 18px;
}

e.g. “Horse Gallery”

.mshHeadingSub
{
    colour: #000066;
    font-weight: bolder;
    font-size: 14px;
}

e.g. “Home Page”
```

Figure 5.5 Examples of CSS used on MSH Website

### 5.1.3 XHTML (eXtensible Hyper Text Markup Language)

Accordingly to W3 Schools [88], XHTML is a combination of HTML (Hypertext Markup Language) and XML (EXtensible Markup Language). XHTML 1.0 was used following the guidelines of W3 Schools and because it follows good codes of practice, as mentioned in Section 1 to produce “well formed” documents, allowing pages to be viewed in a wider range of browsers.
5.1.4 PHP Overview

PHP is the server-side scripting language chosen for the MSH website. The following section explores the use of PHP within the MSH system. A full source-code listing is included in Appendix 15. The Source code has been “commented” where necessary.

The following will be examined to provide the reader with an overview of the PHP and SQL techniques used:

- PHP “Flow Chart”
- PHP Script Explanation (Summarised)
- Programming Highlights
  - Echo
  - Maintaining State
  - Connecting to the Database
  - Consistent Screen Layout and Reducing Duplication: Require() Function
  - Indented Source Code
  - Dynamic Drop-Down Menus
  - Business Logic: Hands to cm Calculation
  - Gallery
    - Layout
    - Thumbnails and Dynamic Resizing
    - Searchable Gallery by Colour and Type
- Management Cost Report
5.1.4.1 PHP Flow Chart

Figure 5.6 provides a good overview of all PHP files used in the MSH website and the interactions between each one. The diagram also contains the standard structure of every visible page in MSH, and how this standard structure is constructed of other PHP files.

Figure 5.6 MSH PHP Flow Chart
This approach has been adopted in the creation of the visual appearance of the website, as it divided the format into logical sections which allows easier maintenance of each visual area. It also allows easy re-use of each section if this is ever required.

### 5.1.4.2 Script Explanation (Summarised)

The following summary examines each individual PHP script file and its respective role in MSH. There are 49 PHP files currently in the MSH system. This is expected to increase as the system “evolves” over the next couple of years.

Table 5.1 is presented in alphabetical filename order for ease of reference:

<table>
<thead>
<tr>
<th><strong>Accessibility.php</strong></th>
<th>Displays information about MSH website accessibility.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>admin_menu.php</strong></td>
<td>Accessible by MSH Management only, allowing access to Manage Users, Manage Enquiries, Manage Suppliers, Manage Horses and Management Cost Report.</td>
</tr>
<tr>
<td><strong>authenticateuser.php</strong></td>
<td>Searches for a matching row in the user table using the username (e-mail address) and password form variables from the login form. If a matching row is found, then the user session variables are set: CurrentUserID, CurrentName, CurrentUserTypeID and CurrentUserDesc.</td>
</tr>
<tr>
<td><strong>banner.php</strong></td>
<td>Included on all visible pages in MSH, it presents the user with the top line (fixed) links and the MSH logo</td>
</tr>
</tbody>
</table>
| **common.php**        | Included as the first line (using Require) on every PHP page, it starts the “session”, sets the database connection variables (e.g. Host, username etc) and sets the markup price (currently at 20%) i.e. the aim of this page is to allow easy site maintenance should the database connection details change etc. common.php also includes some important functions:
  - **checkForAdminLevel()** – redirects web browser to homepage if logged-in user type is not = 3 (admin/management level)
  - **checkForStaffOrManagementLevel()** – redirects web browser to homepage if logged-in user type is not >=2 i.e. non-Management staff or Management Staff
  - **formatDate()** – simple function that takes a date as D/M/Y and reformats it as Y/M/D. It is used when sending a date value to MySQL (which takes dates as Y/M/D).
  - **resize_image()** – takes two parameters – image filename and physical width and dynamically returns an image stream to the browser (not own code – see Internet reference [89]). i.e. the resizing is done on the webserva using the PHP GD graphics library. |
| **contactus.php**     | Display simple list of contact details that is then extended |

Table 5.1 MSH PHP Script Files and Role Explanations
<table>
<thead>
<tr>
<th>File Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>costreport.php</td>
<td>Accessible by Management only, this is a key part of MSH which brings together horse details and costs and displays a tabular report showing profit/loss of each horse. Horses must have been bought by the business to be included in this report.</td>
</tr>
<tr>
<td>default.php</td>
<td>This is the homepage for the MSH website and is a vital page as it needs to create a strong professional first impression for new customers and aims to continually enforce the company image for repeat and registered users.</td>
</tr>
<tr>
<td>deletehorsecost.php</td>
<td>Deletes a horse cost row from the horsecost table, identified by horseCostID parameter and then redirects the browser back to the horsedetails.php page – where the horse details and “add button” are displayed.</td>
</tr>
<tr>
<td>deletenews.php</td>
<td>Deletes a news item from the article table. This is accessed from the default.php page where the news is displayed. Only MSH Management users can manage news items.</td>
</tr>
<tr>
<td>deletesupplier.php</td>
<td>Deletes a supplier item from the supplier table.</td>
</tr>
<tr>
<td>disclaimer.php</td>
<td>Displays the disclaimer and copyright information for the MSH website.</td>
</tr>
</tbody>
</table>
| downloadgalleryimage.php | Uses the resize_image() function in common.php to download a horse image from images/horses folder. This page takes two parameters – imgID (ID of the horse) and the width of the image to be created.  
Note:.(imgID).jpg is the filename of each horse file. (see more detailed information about the Horse Gallery and downloading horse images) |
<p>| edithorse.php        | The most complex data-entry form, used by MSH Management to add/edit horse details. Administrators can use this form to change the uploaded horse image or any other details at any time. |
| enquiries.php        | Displays a filtered list (on Status Type) of enquiries. A graphical icon is displayed next to each enquiry, denoting its status. Status can be New, Pending, Completed or Cancelled. |
| enquirydetails.php   | Used by MSH Management to update MSH response to a particular enquiry. The form is dynamically rendered for the three types of enquiries – General, Buy (express interest) or Sell. Management can add action taken, date of response and overall status (see enquiries.php). |
| expressinterest.php  | Only available to users that have logged in. It is the second type of enquiry, where a user enquires about a particular horse. Accessed from the Gallery or the Horse Details page. |
| footer.php           | Contains a static set of links, which is displayed on every page in the MSH website. |
| forgotpassword.php   | Allows user to enter their e-mail address into a textbox and for the system to send their account details to the same e-mail address. |
| gallery.php          | A key webpage in MSH showing the current stock of MSH horses. Horses are displayed with a subset of details including a thumbnail horse image, if available. |
| help.php             | Displays site help and usage information for all users.                     |
| horsecost.php        | The horse cost item form which allows non-MSH Management staff and MSH Management staff to add, edit and delete horse details. |</p>
<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>horsedetails.php</td>
<td>Displays all recorded information about a horse. If the logged in user is an MSH Management user the system displays both BOUGHT and SOLD details for the horse, if relevant.</td>
</tr>
<tr>
<td>Horseofthe month.php</td>
<td>Horse of the month is displayed on all MSH pages using the require() function. It displays all &quot;approved&quot; horses with horseOfTheMonth field = 1 in the horses table. Horses are displayed as thumbnails and hyperlink is set-up to link to the horse details page for each highlighted horse.</td>
</tr>
<tr>
<td>loginbox.php</td>
<td>This page is included within all MSH pages on the left-hand side and has two modes: (1) User Not Logged In – displays a form that allows user to enter their e-mail address (username) and password (2) User Logged In – displays the logged-in user details and their respective user level description.</td>
</tr>
<tr>
<td>logout.php</td>
<td>Sets the user state session variables to “0” and then redirects the user to the default.php page.</td>
</tr>
<tr>
<td>navigation_main.php</td>
<td>Contains the primary links such as Buy and Sell. The “Admin” link is dynamically displayed based on the session variable “CurrentUserTypeID” = 3 (which is an admin user).</td>
</tr>
<tr>
<td>newsitem.php</td>
<td>Only accessible by MSH Management, this form requires the user to enter the news date, news subject and news body text.</td>
</tr>
<tr>
<td>privacy.php</td>
<td>Displays the MSH website privacy policy.</td>
</tr>
<tr>
<td>register.php</td>
<td>This page/form is used by users registering or editing their user account details. It is also used by MSH Management to edit any user’s details via the users.php page.</td>
</tr>
<tr>
<td>rightlogos.php</td>
<td>This page is included in nearly all MSH pages and displays two horse heads, purely for “cosmetic” purposes.</td>
</tr>
<tr>
<td>saveenquiry.php</td>
<td>Only accessible by MSH Management, it saves the form parameters from the Enquiry Details page to the enquiry table. This always updates an existing enquiry.</td>
</tr>
<tr>
<td>saveenquiry general.php</td>
<td>This page saves the form parameters from the simple Contact Us form on the Contact Us page to enquiry table. It also then redirects the user to the Thank You page, which automatically sends a confirmation page (thankyou.php).</td>
</tr>
<tr>
<td>saveenquiry interest.php</td>
<td>This page saves the parameters from the Enquiry Details page. The enquiry is saved in the enquiry table with the enquiryHorseID field populated with the HorseID. i.e. the horseID that the user is interested in. It also then redirects the user to the Thank You page, which automatically sends a confirmation page (thankyou.php).</td>
</tr>
<tr>
<td>saveenquirysell.php</td>
<td>Saves the form parameters, including uploading the horse image (if attached) from the Sell page and stores the details in the horse and enquiries table. i.e. a new enquiry is created but also a new horse is created too. It also then redirects the user to the Thank You page, which automatically sends a confirmation page (thankyou.php).</td>
</tr>
<tr>
<td>savehorsecost.php</td>
<td>Saves the form parameters from the Horse Cost Details Form and stores them in the horsecost table.</td>
</tr>
<tr>
<td>Savehorse details.php</td>
<td>Only accessible by MSH Management and is the same as SaveEnquirySell.php, but also takes and stores the BOUGHT and SOLD parameters as well as Horse Approval, Horse of The Month and Show Price to Customers checkboxes.</td>
</tr>
<tr>
<td>savenews.php</td>
<td>Only accessible by MSH Management, it saves form parameters from newsitem.php to the Article Table.</td>
</tr>
<tr>
<td><strong>savesupplier.php</strong></td>
<td>Only accessible by MSH Management, it saves form parameters from suppliederetails.php to the Supplier Table.</td>
</tr>
<tr>
<td>----------------------</td>
<td>---------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>saveuser.php</strong></td>
<td>This saves form parameters from register.php to the User Table, either adding a new user, displaying and then e-mail a confirmation message or going back to users.php if the user is an MSH Management user.</td>
</tr>
<tr>
<td><strong>sell.php</strong></td>
<td>This page is a key page in gathering horses that registered users want to sell to MSH. It “forces” the user to enter all required horse fields, although an image of the horse is optional.</td>
</tr>
<tr>
<td><strong>sendpassword reminder.php</strong></td>
<td>Get E-mail Address Form parameter from forgotpassword.php and retrieves the respective password from the user table. The user is then redirected to thankyou.php which takes the parameter typeid (=3) which indicates a password reminder e-mail.</td>
</tr>
<tr>
<td><strong>sitemap.php</strong></td>
<td>Displays simple clickable list of weblinks to each major section in the MSH website.</td>
</tr>
<tr>
<td><strong>suppliers.php</strong></td>
<td>Only accessible by MSH Management, this page displays an alphabetically sorted list of suppliers which then links to each supplier by clicking on the Supplier ID (goes to suppliederetails.php). As an additional feature the post code has been made linkable and links to a new window showing the postcode search in <a href="http://www.multimap.com">www.multimap.com</a>. This is a simple but very useful feature, which has been well-received by the Client.</td>
</tr>
<tr>
<td><strong>testimonials.php</strong></td>
<td>Displays a list of testimonials from existing MSH customers – again a simple, but vitally important part of communicating a professional and friendly business front-end that new potential customers will be interested in and establishing a relationship with.</td>
</tr>
<tr>
<td><strong>thankyou.php</strong></td>
<td>This page generates a visual message and also a confirmation e-mail to the relevant user’s e-mail address. It is used for (1) user registration, (2) enquiries (3 enquiry types) and also (3) password reminders.</td>
</tr>
<tr>
<td><strong>users.php</strong></td>
<td>Only accessible by MSH Management, it displays an alphabetically sorted list of users. Each user is accessed by clicking on the respective UserID link in the list.</td>
</tr>
</tbody>
</table>
5.1.4.3 Programming Highlights

This section presents a range of the techniques used and focuses on a number of significant features within the MSH system.

5.1.4.3.1 Echo

Figure 5.7 represents code from gallery.php showing use of echo. Echo and Print both send strings to the web browser, but Echo executes slightly faster [90].

```php
while($row = mysql_fetch_array($result))
{
    echo "<option value=" . $row["colourID"] . " ">
    echo " id=" . $row["colourID"] . " ";
    if($row["colourID"]==$colourID)
    {echo " selected=" . " ";}
    echo " >";
    echo $row["colourDescription"];
    echo " </option>";
}
```

Figure 5.7 Code Snippet Echo

5.1.4.3.2 Maintaining State

Hyper-Text Transfer Protocol (HTTP) executes each request independently, stateless [91]. PHP can maintain state. Client-Cookies were one option but were not felt to be secure; therefore server-side sessions were adopted [92], which function even if the user switches cookies off. Server-side cookies have been used via the $_SESSION object as shown in Figure 5.8.

```php
// Set Session Variables
$_SESSION["CurrentUserID"]=$row["userID"];
$_SESSION["CurrentName"]=$row["userFirstName"];
$_SESSION["CurrentUserTypeID"] = $row["userTypeID"];
$_SESSION["CurrentUserDesc"] = $row["userTypeDescription"];
```

Figure 5.8 Code Snippet Maintaining State
The following session variables, shown in Table 5.2, were used in MSH to preserve state:

Table 5.2 MSH Session Variables to Preserve State

<table>
<thead>
<tr>
<th>CurrentUserID</th>
<th>Current ID of logged in user. If this value is “0” then the system assumes there is no logged-in user.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CurrentTypeID</td>
<td>This session variable can have four values:</td>
</tr>
<tr>
<td></td>
<td>0 = No logged-in user</td>
</tr>
<tr>
<td></td>
<td>1 = Registered user</td>
</tr>
<tr>
<td></td>
<td>2 = Non-Management Staff</td>
</tr>
<tr>
<td></td>
<td>3 = Management Staff (System Administrator)</td>
</tr>
<tr>
<td>CurrentName</td>
<td>Contains the full name of the currently logged-in user</td>
</tr>
<tr>
<td>CurrentUserDesc</td>
<td>Contains the description of the user level, shown within the Login box.</td>
</tr>
</tbody>
</table>

These session variables are populated within authenticateuser.php once a valid logon is detected (i.e. a matching user record for username and password provided by the user login form).

If an invalid login is performed or a logged-in user clicks the logout option, the above session variables are set to “0”.

### 5.1.4.3.3 Connecting to the Database

The following PHP code in Figure 5.9 shows how the MSH system is connected to the MSH database. In this example, this code is used to increment the default page hitcounter. The hitcounter is only displayed for MSH Management users.

```php
<?php
// Increment Hit Counter
$con = mysql_connect($sphHost,$sphUsername,$sphPassword);
mysql_select_db($sphDBName, $con);
$query= "UPDATE hitcounter SET homepagecounter=homepagecounter+1;";
$result = mysql_query($query);
mysql_close($con);
?>
```

Figure 5.9 MSH Code Snippet: Connect to Database/Hitcounter
This method, including the standard variables (*set in common.php* e.g. `$sphUsername`), is used across the MSH system and provides easily readable and manageable source code, and simplifies system maintenance e.g. changes to database credentials (username/password).

### 5.1.4.3.4 Consistent Screen Layout and Reduced Duplication: 
*Require()* Function

The **PHP Require()** function has proved an important function in the generation of the consistent formatting and easy maintenance of the MSH website.

The Require() function takes a single parameter, which is the filename of the page to load at the point at which the function call is made. The result is for PHP to include the contents of the required page within the current page. This powerful feature allows the relevant PHP files to be assembled together into a single logical PHP.

The structure of the standard webpage in MSH is shown on the left-hand side of the **PHP Flow Chart** diagram. Examples such as the banner, navigation and footer are mostly static XHTML content, with some minor dynamic content such as the “admin” menu if an MSH Management user is logged-in.

In addition to the consistency this brings to all pages in the system, a significant advantage is the ability to change just a link, or text or any content in one of these required files, and for change to be instantly reflected on every web page in MSH. Although simple in concept, this really powerful feature has been allowed more rapid development of the MSH system.

Figure 5.10 shows example of the require function as used in MSH:

```php
require("footer.php");
```

**Figure 5.10 MSH Code Snippet: Require Function**
5.1.4.3.5 **Indented Source Code**

Another important, yet simple, approach has been the consistent “indentation” of PHP source code. This method is particularly useful when dealing with pages with many lines of PHP source code that include nested loops and conditional statements, that often need tracing.

In addition to the PHP source code, the indentation of XHTML is also vital to ensuring accurate and easily maintainable web pages.

Figure 5.11 shows an example of indentation:

```html
<table width="100%">
    <tr>
        <td align="center">
            <!-- Main Container -- 960 pixels wide -->
            <table width="960" class="noBorder" cellspacing="0" cellpadding="0">
                <tr width="100%">
                    <!-- Banner -->
                    <?php require("banner.php") ?>
                </tr>
                <!-- Main Navigation -->
                <?php require("navigation_main.php") ?>
                <!-- Start of Two Cols -->
                <table width="960" cellspacing="0" cellpadding="0">
                    <tr align="top">
                        <td width="760" align="center">
                            <!-- Main Content -->
                            <?php require("landingbox.php") ?>
                            <?php require("horseofthemonth.php") ?>
                        </td>
                        <td width="" align="left" class="mshPaddedT0">
                            <!-- Right Column -->
                        </td>
                    </tr>
                </table>
            </table>
        </td>
    </tr>
</table>
```

Figure 5.11 MSH Code Snippet: Layout of Indented Code
5.1.4.3.6 Dynamic Drop-Down Menus

One of the requirements of MSH was to “capture” accurate information from users about stock, enquiries, suppliers and user details. To improve the data-entry accuracy and “meaning” of this data, drop-down lists have been used where possible. This also has the advantage of making the data-entry process easier for the user. Figure 5.12 shows an example of a drop down box.

![Horse Cost Form](image)

Figure 5.12 MSH Screen Dump, Drop Down Box

In the above Horse Cost form (partial screen dump), the Cost Type drop-down menu can be seen in its expanded form.

However, with the MSH system the aim was to make the website as manageable as possible. Therefore, most drop-down menus have been made dynamic. There are some static drop-down exceptions.
The process for this requires using PHP to build the `<select>…… </select>` tags and content dynamically, populating the `<option>…… </option>` tags from the database. Setting the current user selection is also part of this method.

Dynamic drop-down menus in the MSH system cover the following:

- Horse Type
- Horse Colour
- Horse Sex
- User Type
- Country
- User (for Bought From and Sold To)
- Cost Type
- Enquiry Status

Figure 5.13 shows a basic example of dynamically building the *Cost Type Drop-Down* using the *costtype database table*, a *simple SQL query* and associated *WHILE Loop* to build the `<option>.. </option>` tags.

```php
<br />
<select name="cmbHorseCostType" id="cmbHorseCostType" size="1">
<option value=""></option>
<?php
// Connect to the Database
$con = mysql_connect($sphHost,$sphUsername,$sphPassword);
mysql_select_db($sphDBName, $con);
$result = mysql_query("SELECT
costTypeID,
costTypeDescription
FROM costtype
ORDER BY costTypeID;",
"SELECT
costTypeID,
costTypeDescription
FROM costtype
ORDER BY costTypeID;"
)
while($row = mysql_fetch_array($result))
{
    echo "<option value="" . $row["costTypeID"] . "\"">";
    if($row["costTypeID"]==$horseCostTypeID)
    {echo " selected="selected" ";}
    echo ""></option>
    echo $row["costTypeDescription"];
    echo "</option>";
}
// Close the database
mysql_close($con);
?>
</select>
```

Figure 5.13 MSH Code Snippet: Dynamic Build of Cost Drop Down Box
Again, just to emphasise the advantage of this approach – to add a new cost type to all references of the cost type in the systems (or any other drop-down) it is easily achieved by just adding a row to the relevant “code table”. e.g. horsecost in this example.

5.1.4.3.7 Business Logic: Hands to cm Calculation

An important calculation has been added to the system which converts horse height in “hands” and “inches” to metric Centimetres (cm). The rules are:

- There are 4 inches to a “hand”
- Inches \times 2.54 = cm

Therefore, the calculation included in MSH is as follows:

Height in cm of a horse = ((Hands \times 4) + Inches) \times 2.54

Figure 5.14 shows the actual PHP code to calculate and display this in the horsedetails.php page:

```php
<?php
// Calculate and display horse height in cm
$heightHands = $row['horseHeightHands'];
$heightInches = $row['horseHeightInches'];
$heightCm = round((($heightHands * 4) + $heightInches) * 2.54, 0);
echo "<tr>
   <td>&nbsp;</td>
   <td>Height: </td>
   <td><b>" . $heightHands . " Hands;
      if ($heightInches > 0) {
         echo $heightInches . " Inch(es)";
      }
   echo $heightCm . " cm"
</b></td>
</tr>
```

Figure 5.14 MSH Code Snippet: Calculate and Display Horse Hands/Inches to Centimetres

As shown in Figure 5.15 horsedetails.php page displays details about a horse, including the horse height, using the height conversion calculation:
5.1.4.3.8 Gallery

This “Gallery” is the main tool for the “potential” buyer in the MSH system and provides the user with a searchable current list of horse stock for sale. It has been fully implemented in gallery.php.

Even though the MSH business does not regularly have more than 20 horses for sale, providing a user-friendly fully functional gallery with good performance provided a number of challenges:

- Creating the best layout on screen to display a “thumbnail” gallery of horses
- Creating the best method of “rapidly” displaying thumbnail images of all stock to user without a “significant” download delay
- Ensuring the gallery provides simple search functionality by horse type and colour, as well as displaying enough information to “entice” the potential buyer to register and login

5.1.4.3.8.1 Layout – “Vertical Tiling” of Horse Images without Pagination

The Client indicated that a gallery with a single horse “per line” was most suitable for their requirement. This also made displaying the gallery easier to develop, as
“tiling” the horse images both horizontally and vertically as well as showing a subset of horse information would have been difficult to achieve. This would have been compounded by the common variation in image sizes, as the images are all jpeg horse images taken with different cameras and consequently physical image proportions will vary. Also, images could be either portrait or landscape format.

The Client only wanted a subset of horse data on the gallery, not all the information. This was so they would have to click on a horse to get full details. However, an important requirement was to only allow viewing of more details if the user was registered and logged in.

The horse details required on the public gallery is as follows:

- Colour
- Type
- Sex
- Height
- Age
- Price

To easily generate this in XHTML, a simple two column tabular approach was adopted, showing an image in the left column and horse details in the other column.

To avoid duplicating this code was used for showing horse details in the gallery page and other pages, a single PHP page was developed that just displayed the above subset of horse data in a dedicated XHTML table. For ease, this page also assumes an open connection and result set of available horses. This was then included in each relevant page using the require function, see Figure 5.16.

```php
require("horsedetailstable.php");
```

Figure 5.16 MSH Code Snippet: Require Function
Figure 5.17 shows an example of the gallery layout displaying “vertically tiled” horses with a subset of horse information:

![Figure 5.17 MSH Screen Dump of Gallery showing Vertical Tiling with Subset of Horse Information](image)

### 5.1.4.3.8.2 Thumbnails and Dynamic Resizing

This was certainly the most difficult technical requirement in the MSH to resolve. The challenge comes from having an average of 20 horse images, each up to 4Mb all on the same screen at the same time. This means to render the page on the Internet, the user would have to wait for 20 x 4Mb (80Mb) of images to download.

For users with dial-up or slow broadband connections, they would have probably navigated away to another horse website by the time the MSH gallery was rendered. As an additional complication, MSH Management did not want to lose the full image detail for each horse.

Therefore, the decision was taken to use the built-in graphics library in PHP and dynamically resize the full-size images. This way, the browser only downloads an image which is the same size as the required `<img>` tag size in the gallery, or any other page. In the case of the gallery, the physical required width of the horse images are **200 pixels wide**.
Figure 5.18 shows function which has been implemented in common.php and was taken from the Internet (see reference in source code):

```
function resize_image($filename, $xmax)
```

It uses the following PHP graphics library methods:

- Imagecreatefromjpeg
- Imagecreatetruecolor
- Imagecopyresized
- ImageJpeg
- ImageDestroy

The `resize_image` function uses the above methods to take a filename and load the image into memory, resize it to the new required size and then “stream/send” it back to the webbrowser in the HTTP Header.

This allows the function to be used to directly populate the `<img>` tag. To assist with this method, a dedicated PHP page was created: `downloadgalleryimage.php`.

For ease of access and reference, the uploaded gallery horse images are stored in the `images/horses` sub folder as “(horseID).jpg”. e.g. 1.jpg (horse image for Horse ID = 1)
<?php
require("common.php");

$imageID=$_GET["imgID"]; $width=$_GET["width"]; // Check to see if file exist // Use standard "no picture available" picture // if image file does not exist
$horseFileName="../images/horses/" . $imageID . ".jpg";
if(file_exists($horseFileName))
{
    resize_image($horseFileName, $width);
}
else
{
    resize_image("../images/nopictureavailable.jpg", $width);
}
?>

Figure 5.19 MSH Code Snippet: File Exist Function

Figure 5.19 displays routine which checks to see if the horse has an image (using the file_exists() function). If a horse image does not exist (horse images are optional), it returns the standard “nopictureavailable.jpg”, rather than a “broken” image link. Figure 5.20 displays the “No Picture Available” image:

![No Picture Available](../images/nopictureavailable.jpg)

Figure 5.20 MSH Code Snippet: Require Function

The downloadgalleryimage.php page is used in an <img> tag as seen in Figure 5.21.

```php
echo "<img alt="Click horse image for more information" border="0" class="mshHorseBox" src="downloadgalleryimage.php?imgID={$row["horseID"]}&amp;width=200" width="200" />
```

Figure 5.21 MSH Code Snippet: Use of <img> Tag
Note: a common complexity of embedding HTML tags in PHP can be observed in Figure 5.21, where quotes (”) are required to be added (to maintain full XHTML compliance). This is achieved by adding (\) character before the (”) symbol.

Based on the above resizing method, the following process is required by the user to retrieve the full-sized (source) image from the gallery, as seen in Figure 5.22.
5.1.4.3.8.3 Searchable Gallery by Colour and Type

The gallery search is provided by an SQL query which is dynamically constructed based on the selection from the drop-down menus. It is constructed in a number of different steps, as shown in Figure 5.23.

```sql
$query = "SELECT
    horseID, 
    horseShowName, 
    horseHeightHands, 
    horseHeightInches, 
    horseAgeYears, 
    colourDescription, 
    sexDescription, 
    horseTypeDescription, 
    horseApprovedByMSH, 
    date_FORMAT(horseBoughtDate, '%d/%m/%Y') as formattedDateAdded, 
    horse.horseBoughtForCost, 
    (SELECT SUM(horsecost.horseCostGBP) FROM horsecost WHERE horsecost.horseCostHorseID = horse.horseID) AS HorseCosts, 
    horseShowPriceToCustomers, 
    horseApprovedByMSH 
FROM horse 
JOIN colour ON colourID = horseColourID 
JOIN sex ON sexID = horseSexID 
JOIN horsetype ON horse.horseTypeID = horsetype.horseTypeID 
WHERE ";
$query=$query . "horseSoldToID IS NULL";
```

Figure 5.23 MSH Code Snippet: Gallery Search and SQL Query

Once the basic query is constructed the conditional elements are added if required. There is two drop-down menus on the gallery screen. However, if an MSH Management user is logged-in, an additional View Mode drop-down menu is included, which allows the user to view Approved, Unapproved or (All) horses.

Figure 5.25 shows code which adds these conditions to the $query string variable if drop-down menu selections are made by the user:
```php
if($colourID != "")
{
    $query = $query . " AND horseColourID={$colourID} " ;
}

if($typeID != "")
{
    $query = $query . " AND horse.horseTypeID={$typeID} " ;
}

// Restrict horses view based on view mode
if($viewMode != "A")
{
    $query = $query . " AND horseApprovedByMSH=" . $viewMode ;
}

$query = $query . " ORDER BY horseAddedDate DESC;"
```

Figure 5.25 MSH Code Snippets: Gallery Search and SQL Query

Note: the “full stop” is used to “concatenate” (join) strings together to build up the query string variable.

Once the query string variable is built, it is then executed, the result set is returned from MySQL to PHP and then iterated using WHILE loop in the standard way, as shown in Figure 5.26.

```php
$result = mysql_query($query);
while($row = mysql_fetch_array($result))
{
    echo "<tr valign="top">";
    ..........  

Figure 5.26 MSH Code Snippet: Query String Variable"
Figure 5.27 shows an example of the horse gallery with the *horse type* selection set to “Irish Sport Horses”:

![Figure 5.27 MSH Screen Dump Horse Gallery with Horse Type Selection Set](image)

### 5.1.4.3.9 Management Cost Report

The Management Cost Report is a key Client requirement. The challenge was to develop a report that generated a tabular view of all horses that have been bought by the business, showing their current status. The cost report was implemented in the `costreport.php` page.

Once bought, the horse status can be either *sold* or *not sold*.

The report needed to be able to show this status clearly and their respective total costs with any profit/loss shown, if a horse has been sold.

The report then had to display the sum of these column values.
Figure 5.28 shows a screen dump of the sum of the column values.

![Screen Dump of Sum of Column Values](image)

Figure 5.28 MSH Screen Dump of Sum of Column Values

The report uses the following SQL Query to retrieve the horse details rows from the `horse`, `colour` and `sex` database tables and also calculate, via a subquery, the total costs for each horse from the `horsecost` table.

```sql
$result = mysql_query(
    "SELECT
    horse.horseID,
    colourDescription,
    sexDescription,
    horse.horseBoughtForCost,
    horse.horseSoldForPrice,
    date_FORMAT(horse.horseBoughtDate, '%d/%m/%Y') as formattedDateAdded,
    (SELECT SUM(horsecost.horseCostGBP) FROM horsecost WHERE
    horsecost.horseCostHorseID = horse.horseID) AS HorseCosts
    FROM horse
    JOIN colour ON colourID = horseColourID
    JOIN sex ON sexID = horseSexID
    WHERE horse.horseBoughtForCost>0
    ORDER BY horseID
    ");
```

Figure 5.29 MSH Code Snippet: SQL SubQuery
This resultset is then displayed as an XHTML table and the totals are summed and displayed as a separate row, at the end of the table.

The Client also wanted this report to provide a link to each of the horses in the report. i.e. another way to access the horsedetails for a horse.

Since the gallery only displays non-sold horses, this report is the only way to access ALL horses by MSH Management.

Finally, the Client is aiming at Cost + 20% for all horse sales.

Therefore, the calculation uses is as follows:

\[
\text{Target Price} = (\text{Horse Bought For Costs} + \text{Additional Costs}) \times 1.2
\]

The difference between the actual Selling Cost and the Target Price is the Profit or Loss. In the report, Profit is shown as a positive value, and a Loss as a negative value.

5.2 Physical Website Internet Implementation

Website implementation encompassed domain registration, website hosting, e-mail hosting and on-going website maintenance requirements.

5.2.1 Domain Registration and Internet Service Provider (ISP) Selection

The domain names www.moorhousesporthorses.co.uk and www.moorhousesporthorses.com were registered in July 2007 with Telivo a UK-base, cost-effective and responsive ISP [93].
Telivo offered an excellent package with a very good on-line website, as seen in Figures 5.30 and 5.31.

The two domain names were purchased to secure the company name in the most common markets and to help increase site traffic, with the .com website being signposted to the .co.uk website.

MSH chose the **Starter Plus** hosting package:
5.2.2 Establishing a Holding Page

As soon as the domain was registered, a “holding page” was created to start to track website traffic, but more importantly to act as a testing area to develop the proposed prototype website.

The following static XHTML page, Figure 5.32, was published in July 2007, informing users that the main website was “Under Construction”:

![Figure 5.32 MSH Website Holding Page](image)

5.2.3 Web Server and Database Platform Required

Telivo was chosen for hosting the MSH website as they provided the following functionality:

- **PHP Scripting Support**
  - This was the scripting language required by the MSH website, chosen as it was a powerful web scripting language, studied during Degree study.
  
  *(Version supported by Telivo: PHP Version 5.2.0-8+etch7)*
• MySQL Support
  o MySQL was the DataBase Management Server (DBMS) chosen for the MSH website. It was chosen as it is provided by most ISPs as part of a PHP hosting contract. This was the case with Telivo.
  o Included in the MySQL Support is also PHPMyAdmin which was a web-based tool for managing the MySQL databases from any Personal Computer (PC). (*Version supported by Telivo: 5.0.32*)

• Uniform Resource Locator (URL) Password Protection
  o This was a key factor in ISP selection as not all ISPs allow password protection of folders using .HTACCESS files. Telivo simplified this process by providing a simple Graphical User Interface (GUI) to manage folder permissions as part of their web-based control panel. Password protection was required for the MSH Prototype area, seen in Figure 5.33:

![Telivo Password Protection Facilities](image-url)
5.2.4 Prototype Hosting Area

The MSH system has been developed using an iterative prototyping approach. This process required frequent consultation and demonstrations with the Client, as was documented in Client Meetings.

By hosting the website in a password-protected “prototype” folder, the Client has been able to view the site at their convenience, on their own PC using a secure login. This has helped achieve “early user involvement” in the development process and avoid potential “wasted” development effort.

The other main advantage is that no member of the public is been able to access the prototype system during this time, even though it has still been hosted on the public Internet and has been used for focus group testing.

This has allowed all the website functionality to be tested in the live hosting environment. In particular, features such as e-mailing and dynamic picture resizing have been tested during this process.

5.2.5 Training

Training of the MSH staff and management was conducted at their own premises and was performed using a “large monitor” to firstly demonstrate and then allow them to "experiment" with the website.

Training was provided to MSH in two sessions:

- 3 hours for non-management staff, to explain the full website and their responsibilities (i.e. adding horse costs).

- 2 days - to overview the website and simulate each user level. This included working through administrative functions and examining how they impact on the business. This day proved the most useful for the Client, and so, was able to be much more confident in using the system.
These two sessions also served as excellent testing environment.

The handover process will be completed when the business “fully aligns” their back-end processes with the processes in the website. These are namely the horse management and enquiry management areas.

The owner of the business is going to update the website with information from the past 12 months. This will give him a working and up-to-date cost report, as well as an accurate list of current horse stock details.

MSH do not want to launch the system on the Internet until this work is finalised.

MSH is more than satisfied with the final system and fully appreciated all the hard work and effort (see Appendix 14). The owner agreed the prototyping method to be an excellent way of interacting, providing an ideal "vehicle" for discussion and collaboration.

To augment the classroom-based training, there is a user guide for the following:

- Any user (registered and non-registered)
- MSH Non-Management Staff
- MSH Management / Administrative Staff

Prior to the development of the MSH system, the Client and his staff were noted as being of medium-level IT skills, particularly in the use of Internet/Browser technology. Great care was taken to involve the Client at each stage to ensure their general knowledge of web technology, the potential of the Internet and the usage of the MSH system was highlighted.

An informal working relationship has greatly assisted this training process, which reinforces how important good Client working relationships are, and how they can positively affect the outcome of any project. This was certainly the case with the MSH software project which is fully dynamic with multiple levels of users and functionality.
5.2.6 Final Deployment/Handover

Once MSH gives the go-ahead to launch the site, it is simply a matter of copying the website from the prototype folder to the live web folder, using a standard File Transfer Protocol (FTP) Client.

At the Project end, the company were provided with a fully functional and working model of their requirements by way of a prototype website and Business Management System. They were also given a complete copy of all documents and correspondence, Project Report, Technical Documentation and artwork design for them including a copy on disk for safe keeping and back up purposes.

A duplicate of all the above documentation was also issued to the University for Final Year Project Assessment [18].

5.2.7 Website Maintenance Guide (for Developers and Programmers)

This guide is aimed to at providing programmers and developers with an understanding of the MSH system, with a view to them being able to maintain the system, providing future development and “bug fixes” if required.

As already stated, the system is a dynamic data-driven website based on three main elements and it is expected that programmers/developers would be fully conversant in these technologies:

- PHP Server Side Scripting & Client-Side Javascript Techniques

- SQL (in particular MySQL)

- XHTML (transitional) & Cascading Style Sheets (CSS)

The system is composed of 49 PHP files and a single MySQL database containing 15 normalised database tables. Significant use of the PHP Require() function, dynamic generation of drop-down lists and use of the common.php page (containing central routines and variables) has been made to greatly simplify central updating.
This project report and associated appendices provide an excellent starting point for any developer. It is expected that all developers should be thoroughly familiar with this information prior to performing any development activities.

Significant care has been taken with the source code to ensure it is commented and indented to enhance readability. In addition to this, all resultant XHTML output has been tested in a number of different web browsers and validated by the W3C.

Therefore, it is paramount (and expected by Client) that any developer must continue to maintain these development and documentation standards.

5.3 Security Considerations

Security was examined and the risks were highlighted to the Client, looking at data integrity, privacy, censorship, hacking, authentication and validation.

The product concept was seen to be vulnerable as it was going into the public domain. IDC in October 2004 predicted malicious attacks [94] whilst Analyst IDC (2008) reported fewer than 10% of European companies had a security policy [95].
6 TESTING

6.1 Continuous Development Testing

Continuous testing has been performed throughout the system lifecycle. A major part of this has been conducted during the prototyping phase, where the Client has been greatly involved.

6.2 User Interface Testing Using XHMTL Validation Tools

Validation services were used to ensure the maximum possible audience for the website.

6.2.1 XHTML/Stylesheet Testing

Free on-line XHTML validation software was used [96] to ensure the website conformed to the required standards as set out in Section 1. Figure 6.1 showed home page of holding page to be validated.

Figure 6.1 Holding Page W3C Validation
Figure 6.2 showed W3C validation compliance for MSH register.php file, after it had been executed.

Since the website is dynamic and only certain PHP files generate visible XHTML output, care has been taken to properly validate the XHTML. This was achieved by testing every visible page, viewing source and then pasting into the http://validator.w3.org/check tool. Using this tool guaranteed W3C compatibility.

CSS validation involves two steps:

1. Page to be Section 508 compliant (readable without stylesheet)

2. Use a CSS validation tool [97]

Figure 6.3 shows MSH Holding page results of CSS Validation Service. As a note, each page of both the initial holding page website and the prototype website were checked until they were compliant with both standards.
6.3 Web Browser Testing

The MSH system was tested using IE5+ and FireFox [98]. Figure 6.4 shows an example of the `default.php` page (homepage) in Internet Explorer V7.
Figure 6.5 MSH Homepage Screen Dump as Displayed in FireFox V2
6.4 System Functionality Testing

The MSH system has been extensively tested during its prototyping phase, see Figure 6.6. Testing was carried out in the following areas:

<table>
<thead>
<tr>
<th>Area</th>
<th>Logged In User</th>
</tr>
</thead>
<tbody>
<tr>
<td>User Login, Logout, Forgot Password and Registration/Editing (Own)</td>
<td>Test User, MSH Non-Management User, MSH Management User</td>
</tr>
<tr>
<td>Horse Gallery and Horse Details</td>
<td>Test User, MSH Non-Management User, MSH Management User</td>
</tr>
<tr>
<td>Enquiry: General Enquiry (Contact Us)</td>
<td>Test User</td>
</tr>
<tr>
<td>Enquiry: Express Interest (Gallery)</td>
<td>Test User</td>
</tr>
<tr>
<td>Enquiry: Sell (Uploading)</td>
<td>Test User</td>
</tr>
<tr>
<td>Admin: Users (Adding and Editing)</td>
<td>MSH Management</td>
</tr>
<tr>
<td>Admin: Enquiries (Editing)</td>
<td>MSH Management</td>
</tr>
<tr>
<td>Admin: Suppliers (Adding/Editing/Deleting)</td>
<td>MSH Management</td>
</tr>
<tr>
<td>Admin: News (Adding/Editing/Deleting)</td>
<td>MSH Management</td>
</tr>
<tr>
<td>Admin: Horses (Adding/Editing including Approval, Horse of the Month, Updating Buy and Sold details)</td>
<td>MSH Management</td>
</tr>
<tr>
<td>Admin: Hitcounter (Increment and Display)</td>
<td>MSH Management</td>
</tr>
</tbody>
</table>

Figure 6.6 MSH Prototype Testing

Standard testing including range checks and client-side form validation was also included in this testing process.

Two frequent issues that were found during testing were the entry of “’” (apostrophes) and also “,” (commas) in data-entry form fields. Following the discovery of this particular user “behaviour”, the system was changed to “strip” out these characters from the input fields, prior to the data being saved, or queried in the database.
6.5 Accessibility Testing

Accessibility is primarily concerned with all website users being able to access the web content i.e. the synergy between usability and accessibility. Benefits of the MSH system accessibility approach meant website maintenance cost savings by using CSS stylesheets and improved company reputation by showing a commitment to accessibility.

“Free” accessibility checking software was initially used i.e. that of Bobby, made by CAST (Center for Applied Special Technology) but on 1 March 2008 no longer became a free product [99]. The following website was then used and reference noted [100].

Table 6.1 was used as a quick reference accessibility check, designed from reading accessibility website literature and conforming to legislation and guidelines.

Table 6.1 Quick Reference Accessibility Check

<table>
<thead>
<tr>
<th>Area</th>
<th>Description</th>
<th>Website Conformance</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Design</td>
<td>Design for all browsers</td>
<td>Yes: Internet Explorer, Firefox and Opera</td>
</tr>
<tr>
<td></td>
<td>Design not only for latest browsers</td>
<td>IE version</td>
</tr>
<tr>
<td>Page Layout Design</td>
<td>Give pages meaningful &lt;title&gt;</td>
<td>All pages have title</td>
</tr>
<tr>
<td></td>
<td>Organise navigation in long documents</td>
<td>e.g. Privacy page with anchors, and dynamic gallery with links to each horse details and enquiry form for expressing interest in a horse</td>
</tr>
<tr>
<td></td>
<td>Make documents clear/simple</td>
<td>Website designed with “google-esq” style in mind</td>
</tr>
<tr>
<td></td>
<td>Use contrasted fonts/backgrounds</td>
<td>Well contrasted White/black/blue/grey</td>
</tr>
<tr>
<td></td>
<td>Use real text not images of text</td>
<td>No images of text</td>
</tr>
<tr>
<td>Navigation</td>
<td>Consistent</td>
<td>All pages have same navigation</td>
</tr>
<tr>
<td></td>
<td>Make all links meaningful</td>
<td>Links meaningful e.g. register, email etc</td>
</tr>
<tr>
<td></td>
<td>Provide Site map</td>
<td>Sitemap provided</td>
</tr>
<tr>
<td>Images</td>
<td>Use alt tags on all images</td>
<td>Accurate description given on alt tags on all images, which is part of XHTML compliance</td>
</tr>
</tbody>
</table>
W3C Web Content Accessibility Guidelines 1.0 suggested the following:

- 14 Guidelines with check points [101]
- Checklist [102]
- WCAG 2 (Draft) [103]
- UK Government Guidelines [104]
- Usable Guidelines [105]
7  CRITICAL REVIEW

An overall critical review and project evaluation was conducted not only as a requirement for the Final Year Project, but also to ensure the project deliverables met with the original agreed specification to ascertain whether a suitable solution had been developed.

Critical Evaluation was based upon personal reflection and also measured against documentation produced at the beginning of the project for both the Client MSH and for the University of Teesside. Table 7.1 summarised the measurements used.

Table 7.1 Critical Review Overall Summary

<table>
<thead>
<tr>
<th>Category</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Review</td>
<td>Practical Project University ICA Assessment Criteria</td>
</tr>
<tr>
<td>Personal Review</td>
<td>Personal Reflection</td>
</tr>
<tr>
<td>Personal Review</td>
<td>Considering Factors Table</td>
</tr>
<tr>
<td>Personal Review</td>
<td>Personal Objectives set for MSH Project</td>
</tr>
<tr>
<td>Product Review</td>
<td>Project Specification</td>
</tr>
<tr>
<td>Product Review</td>
<td>Prototype and Website Effectiveness Tools</td>
</tr>
<tr>
<td>Product Review</td>
<td>Systems Requirements List</td>
</tr>
<tr>
<td>Product Review</td>
<td>User Requirements List</td>
</tr>
<tr>
<td>Product Review</td>
<td>Personal Reflection</td>
</tr>
<tr>
<td>Process Review</td>
<td>Personal Evaluation</td>
</tr>
<tr>
<td>Process Review</td>
<td>SMART Objectives</td>
</tr>
<tr>
<td>Process Review</td>
<td>Personal Reflection</td>
</tr>
<tr>
<td>Project</td>
<td>Project Management Triangle</td>
</tr>
<tr>
<td>Project</td>
<td>End Status against Originally submitted TU Project Deliverables</td>
</tr>
<tr>
<td>Project</td>
<td>End Status against MSH Deliverables</td>
</tr>
<tr>
<td>Project</td>
<td>Project Management Skills and Contingency Planning</td>
</tr>
<tr>
<td>Project</td>
<td>Personal Evaluation</td>
</tr>
</tbody>
</table>

7.1  Personal and Academic Achievements/Reflection

The “live” project environment enabled me to bring together and apply my entire BSc Computer Studies Modules’ learning to produce a meaningful piece of work,
utilising basic skills such as Microsoft Word document formulation, down to more complex use of new skills including PHP and MySQL databases.

This project relied upon a high degree of professionalism and self-motivation which was greatly supported by my Project Supervisor M Nawaz. The quality of support and access to resources was exemplary with correspondence being timely and completed with a high degree of professionalism. Although the Project Supervisor had overall responsibility for the management of the project process, as I immersed myself within the project, minimal supervision was required.

With limited knowledge of systems development, this area was the most challenging and time consuming. It involved stretching my learning capabilities and adapting them to the project. Time spent on Systems Analysis and Design (SAD) was well spent as the system was easily shown to the Client who confirmed the systems design with minimal alteration.

This year has been “interesting” and “challenging” with the project getting off to a poor start, as I personally endured many unforeseen issues [106].

Table 7.2 Positive and Negative Aspects to Personal Performance

<table>
<thead>
<tr>
<th>POSITIVE AND NEGATIVE ASPECTS TO PERSONAL PERFORMANCE</th>
<th>FACTORS WHICH HELP</th>
<th>FACTORS WHICH HINDER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highly motivated</td>
<td>Highly dependant young family</td>
<td></td>
</tr>
<tr>
<td>Use of effective study skills</td>
<td>Own business commitments</td>
<td></td>
</tr>
<tr>
<td>Use of available resources including: LRC, Tutorials/Lectures/Materials Meetings with Client/Custumers</td>
<td>Death of 2 close family members</td>
<td></td>
</tr>
<tr>
<td>Attendance on additional complimentary courses</td>
<td>In process of moving/building own house</td>
<td></td>
</tr>
<tr>
<td>Good time management skills</td>
<td>Wanting to achieve 100% perfection</td>
<td></td>
</tr>
<tr>
<td>Personal skills</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commitment/professionalism</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family support</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Well planned/structured</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Determination to succeed</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Upon reflection, Table 7.2 showed the balance was more positive than negative and I was not to be deterred from the overall objective. Personal commitment and support, enabled project completion, whereas personal issues severely compromised available time. The time issue meant a compromised strategy has
to be adopted to bring the project to a conclusion. Technical documentation could have been improved; however, as I had a close-company working relationship with MSH and had worked through explaining the system to them in detail, MSH did not see this as an issue.

Having limited project management and no consultancy skills, this project encouraged the development of both areas within a very practical and live environment. Dealing with a “live” Client with ever-changing requirements is a specialist skill also to move from a blank page to a prototype website was a huge but rewarding challenge.

I was also given the opportunity to develop my computer graphic and web layout skills. These took a significant leap forward as I creating my own graphics, as part of the company requirement list for the MSH logo.

Self-evaluation was also achieved by examining each element of the assessment criteria, as set out in the Module Details for the Practical Project outlined by the University of Teesside [107], results can be seen in Table 7.3.
The following colour key refers to all subsequent tables:

- **Green** = Completed,
- **Amber** = Outstanding Planned Work (within scope)
- **Red** = Incomplete work:

Table 7.3 Self Assessment

<table>
<thead>
<tr>
<th>No</th>
<th>Required</th>
<th>End Status/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>To produce an individual piece of work, under academic supervision within 44 weeks to a professional standard. To manage the project, plan and schedule using allocated time and resources to bring work to a successful conclusion</td>
<td>100% complete</td>
</tr>
<tr>
<td>2</td>
<td>Production of an Artefact</td>
<td>100% complete however future recommendations have been advised.</td>
</tr>
<tr>
<td>3</td>
<td>Production of a Report</td>
<td>100% complete</td>
</tr>
<tr>
<td>4</td>
<td>Completion of Viva Presentation</td>
<td>Awaiting Viva presentation, only completed after report hand in</td>
</tr>
<tr>
<td>5</td>
<td>To develop appropriate work-discipline in planning and execution</td>
<td>Work throughout conducted in a timely and professional manner. 100% complete</td>
</tr>
<tr>
<td>6</td>
<td>Deeper exploration to allow authoritative discussion</td>
<td>Comprehensive analysis and learning took place. Professional discussion undertaken with Client and also to be demonstrated in Viva. 100% complete</td>
</tr>
<tr>
<td>7</td>
<td>Built upon prior learning, showing ability to analyse, synthesise and creatively apply a solution to a problem.</td>
<td>Information from all modules undertaken at Teesside were utilised, see Bibliography. 100% complete</td>
</tr>
<tr>
<td>8</td>
<td>Demonstrate critical and evaluative skills, gaining an understanding for limitations and achievements of both product and process construction</td>
<td>100% complete, see Report Critical Analysis section</td>
</tr>
<tr>
<td>9</td>
<td>Assess and consider legal, social, ethical and professional issues</td>
<td>100% complete</td>
</tr>
</tbody>
</table>

As a part-time student, one of the encountered problems related to a change in Project University requirements between 2007 and 2008. An Executive Summary and Diary were required in 2007 but this requirement was removed in 2008. Although frustrating, as work had been completed and was no longer required, it was a good example of how practical projects do change and the responsibility lies with the producer of the project to make sure they are up to date at all times.

The aspect of the project that most interested me was moving a traditional small business into a broader market i.e. that of e-business by utilising modern technology of the Internet and Web and utilising personal skills of consultancy.
and software development to better understand their business to move it forward. At the end of the project when all requirements were met, my sense of achievement was great as I felt I had brought all my skills together, developed them and produced a meaningful and worthy piece of work.

Table 7.4 Original Personal Objectives set for MSH Project

<table>
<thead>
<tr>
<th>PERSONAL OBJECTIVES SET FOR MSH PROJECT BY C MOORHOUSE</th>
<th>Status/Comment at End of Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>To source a suitable challenging project</td>
<td>100% Completed</td>
</tr>
<tr>
<td>To meet the criteria needs of the University for the Final Year Project</td>
<td>100% Completed</td>
</tr>
<tr>
<td>To develop and enhance current skills particularly in the field of PHP programming (Hypertext Pre-Processor), systems analysis, data modelling skills and Wireless Application Protocol (WAP) technology.</td>
<td>3 out of 4 elements complete with WAP technology still to be implemented 75% complete</td>
</tr>
<tr>
<td>To combine creativity with technical accomplishments</td>
<td>100% Completed</td>
</tr>
<tr>
<td>To set challenging but achievable objectives</td>
<td>100% Completed</td>
</tr>
<tr>
<td>To develop my knowledge of XHTML and writing pure code using Notepad</td>
<td>100% Completed</td>
</tr>
<tr>
<td>To hopefully achieve a good grade by producing an excellent business solution for MSH utilising knowledge and skills learnt in a practical way</td>
<td>100% Completed</td>
</tr>
</tbody>
</table>

Another personal accomplishment has been my knowledge of pure XHTML which prior to this project, was non-existent. I was disappointed not to have encompassed the addition of WAP technology having spent time researching and preparing to implement it, but Client requirements to the current system grew as the Client became more aware of how IT could help business. This culminated in insufficient time to complete this phase. In the initial stages, the Client also expressed an interested in utilising video footage, but again time was spent developing the re-sizing of images in the photo gallery which the Client believed was more important.

Future consideration of better time management and maintaining project scope would assist in “project creeping” [108] being an issue for future projects.
It was a challenge to decide upon the project boundaries i.e. scope and requirements, but a vital part of project management, otherwise the project would be continually ongoing. It was a real challenge to turn the scenario requirements into a working piece of software that actually solved real life business problem(s).

As a conclusion, the project not only enhanced my academic skills but also gave me invaluable skills for future employment and self-growth.
7.2 Product Review

The product was evaluated against a number of items which again were summarised in Table 7.1. The most important measurement was that of comparing the final system with the original set of MSH Client System Requirements.

Table 7.5 identifies end of project status mapped against original Client System Requirements. With nearly 100% completion on all items set.

<table>
<thead>
<tr>
<th>MSH CLIENT SYSTEM REQUIREMENTS</th>
<th>No</th>
<th>Item</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Increase Customer Base</td>
<td>Although, at the request of MSH, the website has not as yet gone live, customer base has increased but is expected to considerably increase once fully operational 100% complete</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Maintain Stock of Horses and Record Horse Transactions</td>
<td>100% complete, fully operational dynamic database storing horse costs and details</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Individually Designed Software</td>
<td>100% complete</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Mimic Offline Service with Online Service</td>
<td>100% complete, user friendly website, use of personalised signature on front page, plenty of customer feedback, supply of User Guide to users</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Record Customer Details</td>
<td>100% complete, fully operational dynamic database storing customer details</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Improve Enquiry Management</td>
<td>100% complete, all enquiries and logged and have a status associated with them so Management are aware if queries have been answered or are outstanding</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>Record Supplier Details</td>
<td>100% complete, fully operational dynamic database storing supplier details</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>Improve Real-Time Cost Reporting</td>
<td>100% complete, provision of MSH management reports</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>Increase use of Digital Technology</td>
<td>100% complete</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>Improve Internal/External Communications.</td>
<td>100% complete as all information is stored in the database</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>Utilise Mobile Technology</td>
<td>Still to be completed</td>
</tr>
</tbody>
</table>

As discussed previously in Section 7.1, it was disappointing that the WAP element of the project was not complete. This was due in part to project creep on other items such as image re-sizing. The client however was happy to accept this would be a future enhancement.
End of project status was also measured against the original Project Specification. This was one of the first documents produced for this project, required by the University of Teesside.

Table 7.6 identifies end of project status mapped against original Project Specification issued to the University of Teesside with 100% completion on all items set.

<table>
<thead>
<tr>
<th>No</th>
<th>Proposed Objectives in Project Specification</th>
<th>End Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Potential to register potential and existing customers and login securely</td>
<td>100% complete, see website front page login and validation</td>
</tr>
<tr>
<td>2</td>
<td>Enable customers to record their requirements</td>
<td>100% complete, see dynamic customer enquiry page</td>
</tr>
<tr>
<td>3</td>
<td>Enable customers to record individual profiles</td>
<td>100% complete, see dynamic customer profile page</td>
</tr>
<tr>
<td>4</td>
<td>Collect and centrally store customer/product and marketing data</td>
<td>100% complete, see database tables</td>
</tr>
<tr>
<td>5</td>
<td>Enable a workable stock and costing system</td>
<td>100% complete, see database tables/admin report functions</td>
</tr>
<tr>
<td>6</td>
<td>Offer searchable gallery</td>
<td>100% complete, see horse gallery</td>
</tr>
<tr>
<td>7</td>
<td>Propose useful management features</td>
<td>100% complete, see admin features</td>
</tr>
<tr>
<td>8</td>
<td>Promote company image/reputation in a different medium</td>
<td>100% complete, designed new logo and produced prototype</td>
</tr>
<tr>
<td>9</td>
<td>Operate secure and confidential system</td>
<td>100% complete, conforms to data protection and validation</td>
</tr>
<tr>
<td>10</td>
<td>Website to contain text, images and possibly video</td>
<td>100% complete, see prototype website</td>
</tr>
</tbody>
</table>
Table 7.7 emanated from User Analysis in Section 4. The project was then measured against original website requirements. An extra comments column was added to the original table to show end of project status.

Table 7.7 MSH User Website Requirements

<table>
<thead>
<tr>
<th>No</th>
<th>User Requirement</th>
<th>End of Project Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Obvious Home Page</td>
<td>Design was “google-esq”, stylish yet obvious</td>
</tr>
<tr>
<td>2</td>
<td>Intuitive/User Friendly/Easy to use/Predictable/Effortless to use, learn and understand, technology that fits both purpose and all users</td>
<td>Navigation remained the same throughout the site so easy to use, information and activities word based, what user would expect. Elements of interaction and functionality to suit all user</td>
</tr>
<tr>
<td>3</td>
<td>Clear, plenty of white space, not too busy/cluttered</td>
<td>Design “google-esq”. Lots of white space, only required information given</td>
</tr>
<tr>
<td>4</td>
<td>Audience appropriate content, suitable for sport horse buyers and sellers, plenty of interesting content i.e. gallery, graphics, words, colours, age, gender, computer experience (User Centered Website)</td>
<td>Site full of content relating to horses, news, text and images. Easy to access gallery and sales forms. Site suitable for all users with varied computer literacy. Website built around what the user asked for</td>
</tr>
<tr>
<td>5</td>
<td>Good contrast of colours (background/foreground/images)</td>
<td>Followed tried and tested guidelines regarding colour pallets, number of colours and contrast</td>
</tr>
<tr>
<td>6</td>
<td>Legible Text</td>
<td>All text in a sans serif font at a legible size</td>
</tr>
<tr>
<td>7</td>
<td>No distracting information e.g. pop ups</td>
<td>No distracting pop ups or flashing images used</td>
</tr>
<tr>
<td>8</td>
<td>Uniformity of navigation/style/layout</td>
<td>Used a template design throughout the site to maintain style and layout.</td>
</tr>
<tr>
<td>9</td>
<td>Search facility</td>
<td>Searchable horse gallery to search on two fields</td>
</tr>
<tr>
<td>10</td>
<td>Aesthetically pleasing, good balance between graphics and text</td>
<td>Very clean and crisp layout so all information stands out with a good balance of text and images</td>
</tr>
<tr>
<td>11</td>
<td>Interesting/innovative</td>
<td>A very modern style but adopting innovative design and a unique selling point for the website</td>
</tr>
<tr>
<td>12</td>
<td>Minimal download time</td>
<td>All images are suitable sizes with a re-sizing facility to reduce the size of a user’s photo if it is too large.</td>
</tr>
<tr>
<td>13</td>
<td>Accessible website conforming to guidelines and legislation</td>
<td>Website conforms to legally required Accessibility guidelines and to current legislation</td>
</tr>
<tr>
<td>14</td>
<td>Easy maintenance website</td>
<td>Website designed with easy to use input interface for the management and user. The means minimal website maintenance</td>
</tr>
<tr>
<td>15</td>
<td>Members login area</td>
<td>Login area obviously placed on front page in a “hot spot zone”, as researched by the guru J Nielsen.</td>
</tr>
</tbody>
</table>

Feedback from all site users was very positive throughout the design, training and hand over phases.
Website effectiveness was another measure using the following items:

- Focus Group
- Questionnaires
- Website hits (hitcounter)
- Ghost shopping
- Lost Customer Analysis
- Complaint and suggestion system
- Customer satisfaction surveys/feedback

Website effectiveness was measured by way of utilising the prototype area to gain continuous valuable customer feedback with a hidden web counter to capture valuable statistical information. This market intelligence will enable the owner to make better informed future choices of which pages are the most popular. The overall early development and continuous updating of the prototype version of the MSH website has been a vital tool in the successful implementation of the system, satisfying Client system functionality and also still working within the agreed project schedule.

User Requirements and design solutions were also considered. Table 7.8 shows a list of website user requirements followed by a list of how these requirements were fulfilled.
<table>
<thead>
<tr>
<th>User Requirements</th>
<th>Fulfilled By</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Obvious Home Page</strong></td>
<td>Home Page immediately shows key graphics directly relevant to target user, enticing user to explore the website. It has obvious context due to title of company and brief text explanation. Is dynamically updated and charges daily.</td>
</tr>
<tr>
<td><strong>Intuitive, User-Friendly Easy to Use &amp; Predictable Website</strong></td>
<td>Layout is as target user would expect, plenty of text graphics, downloadable material. Navigation is simple. Provided a collection of frequently asked questions for easy searching. Provided a search facility for ease of use. Based on user profile, all elements in website are shown to user i.e., login, navigation, undefined hyperlinks. Designed uniformly in site allowing users to carry knowledge from previous experience to this site.</td>
</tr>
<tr>
<td><strong>Clear, Plenty of white space, not too busy &amp; cluttered</strong></td>
<td>Good use of white space, use of headings/footers/fixed sizes and positioning on page. All information is current, links work, information located on screen appropriate to its importance. No advertising/upsells will appear in finalised site. All information is easily obtained within a minimum number of clicks. Helpful additional information is offered to the user. Navigation by means of a map, clearly visible in prominent position which always remains in same location. Plenty of white space around images and text - less clutter for people with disabilities.</td>
</tr>
<tr>
<td><strong>Technology fits both purpose and user</strong></td>
<td>Used technology that target user would be expected to have i.e., browser, screen resolution setting, download speed.</td>
</tr>
<tr>
<td><strong>Audience appropriate content, suitable for sport horse buyers and sellers, plenty of interesting content</strong></td>
<td>Designed to targeted user (see Defining User Sections). Designed to provide a unique service to buyers and sellers of horses and ponies i.e. to fulfill the target user requirements within one website by providing extensive range of text information, video and images splitting information into two sections - buyers/sellers making it easy for user. Also offer unique selling point of providing user with a unique service to source their requirement. Keep website fresh and interesting. Provided expected level of images and information content.</td>
</tr>
<tr>
<td><strong>Audience appropriate, graphics, wording, colours, etc, gender, computer experience</strong></td>
<td>All relate to the topic and the user, designed using corporate, well contrasted colours, catering for a cross section of ages i.e., content for all, gender (content relating to man/female and overall website colour not specific), and computer experience (nothing too simple for the expert user or too detailed for the novice). Could not use it.</td>
</tr>
<tr>
<td><strong>Good contrast of colours (background/foreground/Images)</strong></td>
<td>Stick to recognised guidelines of using too more than 4 colours on a page, been consistent and considered the impact of specific colours on culture viewing deficiencies/colour blindness issues. Used web safe colours and universal link colour system i.e., underline for hyperlinks. Colour chosen from colour circle at equidistant points around colour circle. Used predominantly black text as colour text is not visible (Fawler &amp; Stimson 1995) used colour as categories. Information.</td>
</tr>
<tr>
<td><strong>Legible Text</strong></td>
<td>Avoided text for older users, used point size 12 for body text, used medium and bold face type. Used justified as expected/typewriter for middle age/follower users. Used dark text with light background. Used initial capitals as opposed to all capitals as this &quot;shuts up the audience&quot;. Design would include offering the user the option to change text size.</td>
</tr>
<tr>
<td><strong>No disturbing information e.g., pop-ups</strong></td>
<td>Less clutter for people with disabilities.</td>
</tr>
<tr>
<td><strong>Uniformity of navigation and display</strong></td>
<td>Made site consistent so it gives user a feeling of being at home, familiarity, reduced learning load. Site is compatible with target user's preference experience.</td>
</tr>
<tr>
<td><strong>Search facility</strong></td>
<td>Designed as an interactive feature to help and support all users. Database search facility to search horse gallery.</td>
</tr>
<tr>
<td><strong>Good balance between graphics and text</strong></td>
<td>Text and graphics were used to be appealing and improve screen readability.</td>
</tr>
<tr>
<td><strong>Front page that does not scroll</strong></td>
<td>Re-sizing tool page that will fit onto an 800 x 600 screen.</td>
</tr>
<tr>
<td><strong>Interesting and innovative and aesthetically pleasing to use</strong></td>
<td>Used guidelines for better composition, using the third rule and lines for positioning images and text.</td>
</tr>
<tr>
<td><strong>Minimal download time</strong></td>
<td>Optimised all graphics for faster downloading speed. Created code so users image code is re-sized.</td>
</tr>
<tr>
<td><strong>Accessibility</strong></td>
<td>Website design with target user in mind. Consideration given to speed of internet connection, software requirements, hardware requirements, skill level and expectations, intended purpose of site. Marked up pages carefully so they can be translated in a text reader, used titles, made navigation clean/always in the same place/easy enough for people with physical disabilities. Have not used modified or customised web page stylesheets/images considered using standard compliance (W3C standards).</td>
</tr>
<tr>
<td><strong>SEO</strong></td>
<td>Commissioned using grammatically correct sentences with good punctuation including full stops. Broken down information into small chunks. Used User Centered Web Development methodology to design website. Designed colours to cater for broad audience and sub-topics. Used captions on tables to help people who use text readers. Used style sheets to set uniformity. Used contrasting contrasts to background and to help people with colour blindness. Chosen a sans serif text as this is easier to read for older/elderly users. Hyper-text links followed the <a href="http://www.mooreshinesports.com">www.mooreshinesports.com</a> and <a href="http://www.moorshinesports.com">www.moorshinesports.com</a> obviously so target user can remember.</td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td>Presented info in an organised, structured, familiar and meaningful manner. Placed all related information in close proximity (i.e. navigation). Control given to user over page on where they wish to navigate. Site design not to overload user's memory. Attention is not distracted as harmonious colours have been used. All important information is displayed in the most prominent places, i.e. title at the top.</td>
</tr>
<tr>
<td><strong>Perception</strong></td>
<td>All navigational items placed together for both primary and secondary navigation. Well-balanced website using vertical, horizontal and right angles for both text and graphics. They expect to find initial information very quickly in a matter of seconds and don't expect to have to work to find the information. All icons have been designed to be obvious. Quality of data has been analysed and presented in a logical format. The site has been designed around the target users skills so no new skill acquisition is required. Give site a functional and professional look and feel with fun elements of creativity, using a contrast of colours for text and background.</td>
</tr>
<tr>
<td><strong>Interactions</strong></td>
<td>Used throughout the website to let user feel in control e.g. clicking on navigation button (mouseover over word button to active, activate on &quot;Press&quot; and shows a depressed state when pressed). Form filling, login, search feature, cursor change. Traditional navigation used as it is expected by target user. Menus allow various user abilities, choice of functions, information grouped by category and follow guidelines of no more than 5 menu choices. Client-side interactions of JavaScript allows instant response to user interaction. Server Side Interactions Formats (eg), sending/receiving data (email, search systems).</td>
</tr>
<tr>
<td><strong>Share Information</strong></td>
<td>Provided user with member log in to capture customer details and also provide a personal service i.e. &quot;hello, name!&quot;. Provided email so users can create info. All received info will be used to improve site and determine website effectiveness.</td>
</tr>
<tr>
<td><strong>User-Centric Website</strong></td>
<td>Created a website using UCD methodologies, creating value-added customer services not available on any other site, doing it better than anyone else by identifying participant's and satisfying customer need by providing comprehensive and unique information.</td>
</tr>
</tbody>
</table>
7.3  Process Review

The process referred to both methodology and formative and summative evaluation.

7.3.1  Methodology

It was felt the hybrid methodology approach worked very well for this project and would certainly be considered again. It allowed for flexibility, by adopting a selection of the methodology to best suit the need as and when required. It was also felt that adopting a suitable Systems Development Methodology provided a working and reliable system which met user requirements, within cost time and budget.

The chosen methodologies were not only suitable for the project but easy to learn and understand. I particularly liked the RUMM and UCWD methodologies as I believe these led to a website which fulfilled the needs of the user.

Limitations to the UCWD Methodology related to defining the user. Primarily it related to the time available to conduct an appropriate user research and the limited amount of academic research available regarding the equestrian world.

Personal research was time consuming yet very rewarding, However, analysis highlighted a very sound and unique selling point for the website which complimented their niche market position i.e. a simplistic website dedicated to the purchase and sale of horses and ponies, being able to register details of requirements and obtaining a response with minimal user intervention. It may have been possible to extend preliminary research but this would have been at the expense of the rest of the project.

The hybrid methodology proved effective and could certainly be adapted for a future project.

The effective use of SMART objectives meant the project followed a well documented recognised methodology and professionalism.
7.3.2 Evaluation: Formative/Summative

Formative evaluation was useful to examine learning materials and to look at the strengths of my own learning style and achievements. The techniques used, built upon previous learning and ascertained what needed to be learnt i.e. materials, skills and problem solving in order to produce a meaningful outcome [110].

Summative evaluation was useful to judge the end worth i.e. the Project outcome.

The balance between formative and summative evaluation was achieved using Kirkpatrick’s four levels of evaluation (2 summative and 2 formative) [111].
7.4 Project Review

Project completion and success were measured against a number of criteria, again as identified and summarised in Table 7.1.

The Project Management Tool of the Triangle, i.e. Cost versus Time versus Quality was evident throughout the project as to enable the project to come to a close, compromise was made to certainly elements of the project not being finalised i.e. the implementation of the WAP technology and the possibility of video downloading. The Client however was very happy with the functionality of the site, which surpassed his original specification so was happy to consider future development after handover.

7.4.1 End Project Status: University of Teesside BSc Project Deliverables 2008

Figure 1.2 in Section 1 of the Introduction outlined the deliverables for Teesside University BSc Project.

Table 7.7 showed the status of the original requirements at project completion, with all items being 100% successfully completed apart from the Viva which is to be conducted after the hand in of the Project Report.

Table 7.7 End of BSc Project Status Overview and Deliverables Teesside University 2008
7.4.2 End Project Status: MSH Project Deliverables 2008

Figure 1.3 in Section 1 of the Introduction outlined the original deliverables identified for MSH.

Table 7.8 showed the status at project completion, with all items being 100% successfully completed.

Table 7.8 End of Project Status Deliverables for MSH

<table>
<thead>
<tr>
<th>Item</th>
<th>Detail</th>
<th>Date/Requirements</th>
<th>End Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prototype Website</td>
<td>Develop and present a Prototype Website conforming to MSH/legal requirements</td>
<td>21/04/2008</td>
<td>100% complete - Prototype shown to client on 14/04/08 and signed off by client.</td>
</tr>
<tr>
<td>Logo</td>
<td>Project will design a suitable company logo</td>
<td>12/01/2008</td>
<td>100% complete - Design given and signed off by client.</td>
</tr>
<tr>
<td>Project Report</td>
<td>Supply client copy of Project Report</td>
<td>21/04/2008</td>
<td>100% complete.</td>
</tr>
<tr>
<td>Training</td>
<td>Provide training to MSH Administrator</td>
<td>w/c 31/03/2008</td>
<td>100% complete 3 days training programme given to MSH Administrator 14/01/08 March 08.</td>
</tr>
</tbody>
</table>

Sound Project Management skills were also developed for this project as I became very aware that my original planning with a contingency element built in worked very well as the project did not always run to time. Contingency planning however meant that it was in fact finished on time.

Project progress was also measured against Gantt charts, proposed versus actual timing of the project. A number of schedules were produced for this project, with times amended to take account of the changing environment. Good user of contingency planning again meant that the project was completed to plan within budget.
Table 7.9 showed the completed Project Schedule. This plan showed the proposed work indicated by an x, now replaced with blocks of colour to indicate completed or outstanding work. At project end date, each section of the Project Schedule had been completed.

In summary, the success of this project was felt to be directly attributed to the fact that the project had been business and people led. The developed solution fulfilled a real need of both a business and its customers [113].

7.5 Conclusion

In conclusion, this work was not only a dissertation, but a “Live Project” with an actual deliverable software application. Moorhouse Sporthorses required a solution to increase their marketing base and improve business operations to bring them into the 21st Century.

It was agreed, a Business Management System, with a front-end website and a back-end database, would be a suitable solution and was delivered.
Project originality may not initially be seen from the solution but the challenge has been moving a non-technical company and industry into a new medium and finding a unique niche in the market for the company to survive. A recent article in Computing Magazine 07 June 2007 by Dinah Greek of Computeractive believes by 2010, nearly half of the UK’s wealth will be generated from IT professional ideas [114].

An initial Internet presence (holding page) was launched in January 2008, with the final product of a prototype website being handed over in April 2008.

Reference has been continuously made to recognised practices and procedures, methodology and user requirements, integrating both the current Business/Marketing Plan with the proposed Internet Marketing Plan.

The report concludes with the potential future development and recommendations for the website, providing a niche strategy from which to secure its future position.

In summary, I have found the project both challenging and rewarding. A host of learning opportunities have been derived from undertaking this work.
8 RECOMMENDATIONS

The following areas have been identified as possible areas of improvement:

<table>
<thead>
<tr>
<th>MSH FUTURE RECOMMENDATIONS FOR WEBSITE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Provide WAP Integration</td>
</tr>
<tr>
<td>2 Develop Handling of Multimedia such as Videos and image management (e.g. on-line rotation)</td>
</tr>
<tr>
<td>3 Integrate CCTV (HorseCam)</td>
</tr>
<tr>
<td>4 Consider On-line Marketing, Search Engine Optimisation to increase on-line market share</td>
</tr>
<tr>
<td>5 Further Reporting/Business Functionality i.e. more Supplier Information, integrating Payroll</td>
</tr>
<tr>
<td>6 Make User Guides available on-line to all users (PDF downloadable format)</td>
</tr>
<tr>
<td>7 Business stock is approximately 20 horses at any one time, as business increases, the Gallery could need to be paginated to display 20 horses per page</td>
</tr>
<tr>
<td>8 Development of hit counter feature to provide deeper market intelligence</td>
</tr>
</tbody>
</table>

It was proposed that the use of WAP technology be further developed and fully implemented with the website by end of December 2008. This will provide the current user group with additional required features and will allow a reduction in travelling expenditure of prospective buyers and sellers.

National Statistics stated “E-commerce is likely to have a huge impact on the way we do business. It has the potential to lead to dramatic growth in trade, increase markets, improve efficiency and effectiveness and transform business processes”.

The company also had a vision to provide more on-line services, and were inspired when they viewed what could be achieved with modern technology and their new website functionality.

An improvement in the use of video technology would be proposed, so the owner could take footage of a horse, or a seller could send footage of a horse, both of which to save unnecessary journey time to go and view product which would not be suitable. Further development of more dynamic images would be a proposal so they could be rotated within the gallery.
Moorhouse Sporthorses Business Management System

The company would certainly benefit from greater functionality from the website to provide additional business reports, market analysis and sales analysis to help with features such as detailed cost reporting, improving customer service and profitability. The future recommendation would be to put their payroll system and purchasing system onto the database to gain a more centralised approach.

It is however strongly recommended that the company assess the benefits of the current website prior to any further investment or development being planned.
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11 APPENDIX

11.1 Appendix 1: List of Abbreviations/Special Terms

11.2 Appendix 2: Project Proposal

11.3 Appendix 3: Project Specification

11.4 Appendix 4A: Summary of Basic Feasibility Study
Appendix 4B: 7ps Marketing Mix Analysis for MSH

11.5 Appendix 5A: Draft Overview University Deliverables 24/04/07
Appendix 5B: University Project Deliverables Amended 09/07
Appendix 5C: Client Project Deliverables 26/6/07

11.6 Appendix 6: Draft Project Schedule

11.7 Appendix 7A: Detailed Project Schedule (24/4/07)
Appendix 7B: Amended Project Schedule (26/6/07)
Appendix 7C: Completed Project Schedule (20/4/08)

11.8 Appendix 8A: Project Supervisor Meeting Minutes
Appendix 8B: Project Client Meeting Minutes

11.9 Appendix 9: Example Monthly Project Activity Log

11.10 Appendix 10: Ethical Release Form (To be completed by Supervisor)

11.11 Appendix 11: Personal Research MSH Current/Potential Clients and Market Research

11.12 Appendix 12: Result Summary of Competitor Visual Map Exercise

11.13 Appendix 13: Copy of Artwork for MSH Logos

11.14 Appendix 14: Client Letter Authenticating/Sign Off Work

11.15 Appendix 15: Hard Copy of PHP Source Code

11.16 Appendix 16: Copy of CSS Stylesheet, Javascript Code, Asset Register and Images

11.17 Appendix 17: MSH User Guide

11.18 Appendix 18: Copy of MSH Website presented on 2 x CDs
12 FIGURES/TABLES

<table>
<thead>
<tr>
<th>Section No.</th>
<th>Figure No.</th>
<th>Table No.</th>
<th>Details</th>
<th>Page No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.1</td>
<td></td>
<td>Prototyping Model, D Chaffey, Internet Marketing</td>
<td>3</td>
</tr>
<tr>
<td>1</td>
<td>1.1</td>
<td></td>
<td>BSc Project Overview and Deliverables 2008</td>
<td>4</td>
</tr>
<tr>
<td>1</td>
<td>1.2</td>
<td></td>
<td>MSH Project Deliverables 2008</td>
<td>4</td>
</tr>
<tr>
<td>1</td>
<td>1.3</td>
<td></td>
<td>Project Objectives For MSH</td>
<td>5</td>
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<tr>
<td>1</td>
<td>1.4</td>
<td></td>
<td>Personal Objectives</td>
<td>6</td>
</tr>
<tr>
<td>1</td>
<td>1.2</td>
<td></td>
<td>Johnson &amp; Scholes Model of Strategic Management Elements</td>
<td>8</td>
</tr>
<tr>
<td>1</td>
<td>1.3</td>
<td></td>
<td>Simple Framework for Internet Strategy Development</td>
<td>9</td>
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<tr>
<td>1</td>
<td>1.4</td>
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<td>MSH Project Mind Map</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>2.1</td>
<td></td>
<td>Strengths &amp; Weaknesses of Waterfall versus Incremental Models</td>
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<tr>
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<td>2.1</td>
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<tr>
<td>2</td>
<td>2.2</td>
<td></td>
<td>Iterative Waterfall</td>
<td>14</td>
</tr>
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<td>2.3</td>
<td></td>
<td>Systems Development Lifecycle</td>
<td>14</td>
</tr>
<tr>
<td>2</td>
<td>2.4</td>
<td></td>
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<td>16</td>
</tr>
<tr>
<td>2</td>
<td>2.2</td>
<td></td>
<td>Summary of Findings by Lang &amp; Fitzgerald on Web Development</td>
<td>17</td>
</tr>
<tr>
<td>2</td>
<td>2.5</td>
<td></td>
<td>Overview of RUMM Methodology</td>
<td>18</td>
</tr>
<tr>
<td>2</td>
<td>2.6</td>
<td></td>
<td>User Centered Design Process</td>
<td>19</td>
</tr>
<tr>
<td>2</td>
<td>2.7</td>
<td></td>
<td>RMM Design Methodology</td>
<td>19</td>
</tr>
<tr>
<td>2</td>
<td>2.8</td>
<td></td>
<td>Usefulness of RMM Approach</td>
<td>20</td>
</tr>
<tr>
<td>3</td>
<td>3.1</td>
<td></td>
<td>MSH Client System Requirements (May 2007)</td>
<td>23</td>
</tr>
<tr>
<td>3</td>
<td>3.1</td>
<td></td>
<td>Context Diagram for Moorhouse Sporthorses</td>
<td>26</td>
</tr>
<tr>
<td>3</td>
<td>3.2</td>
<td></td>
<td>MSH Events List</td>
<td>27</td>
</tr>
<tr>
<td>3</td>
<td>3.2</td>
<td></td>
<td>Dataflow Diagrams (Yourdon Methodology)</td>
<td>28</td>
</tr>
<tr>
<td>3</td>
<td>3.3</td>
<td></td>
<td>MSH Top Level DFD</td>
<td>29</td>
</tr>
<tr>
<td>3</td>
<td>3.4</td>
<td></td>
<td>MSH Low Level DFD 1.1 Manage Users</td>
<td>30</td>
</tr>
<tr>
<td>3</td>
<td>3.5</td>
<td></td>
<td>MSH Low Level DFD 1.2 Manage Suppliers</td>
<td>31</td>
</tr>
<tr>
<td>3</td>
<td>3.6</td>
<td></td>
<td>MSH Low Level DFD 1.3 Manage News</td>
<td>32</td>
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<tr>
<td>3</td>
<td>3.7</td>
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<td>33</td>
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<td>35</td>
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<td>Porters Generic Strategy Model applied to MSH and Main On-line Competition</td>
<td>36</td>
</tr>
<tr>
<td>3</td>
<td>3.12</td>
<td></td>
<td>DEFRA Horse Industry Breakdown Diagram (2005)</td>
<td>38</td>
</tr>
<tr>
<td>3</td>
<td>3.3</td>
<td></td>
<td>The British Horse Industry Federation Overview of Horse Industry</td>
<td>39</td>
</tr>
<tr>
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<td>3.4</td>
<td></td>
<td>Internet Usage and Population Statistics</td>
<td>39</td>
</tr>
<tr>
<td>3</td>
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<td>National Statistics, Use of the Internet, 2006, GB</td>
<td>40</td>
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</tr>
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<td>3.16</td>
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<td>UK Broadband Connections</td>
<td>41</td>
</tr>
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<td>3.17</td>
<td></td>
<td>Most Popular Digital On Line Devices</td>
<td>43</td>
</tr>
<tr>
<td>3</td>
<td>3.5</td>
<td></td>
<td>W3C Schools Web Statistics and Trends 2008, Browser Statistics Month By Month</td>
<td>44</td>
</tr>
<tr>
<td>3</td>
<td>3.6</td>
<td></td>
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<td>45</td>
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<td>45</td>
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<td>Section No.</td>
<td>Figure No.</td>
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<td>SWOT Analysis Conducted on MSH Website Presence</td>
<td>46</td>
</tr>
<tr>
<td>3</td>
<td>3.9</td>
<td></td>
<td>Summary of Web Analysis for MSH</td>
<td>46</td>
</tr>
<tr>
<td>4</td>
<td>4.1</td>
<td></td>
<td>Table 4.1 Data Dictionary Tables: Article / Colour / Costtype / Country /</td>
<td>47-52</td>
</tr>
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<td></td>
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<td></td>
<td>Enquiry / Enquirytype / Hitcounter / Horse / Horsecost / Horsetype / Sex /</td>
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<td>4</td>
<td>4.2</td>
<td></td>
<td>Client Web Browser/PHP/MySQL Hardware and Software</td>
<td>53</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>4.1</td>
<td>Client Server Model</td>
<td>54</td>
</tr>
<tr>
<td>4</td>
<td>4.2</td>
<td></td>
<td>MSH 3-Tier Architecture</td>
<td>55</td>
</tr>
<tr>
<td>4</td>
<td>4.3</td>
<td></td>
<td>MSH Entity Relationship Diagram</td>
<td>56</td>
</tr>
<tr>
<td>4</td>
<td>4.4</td>
<td></td>
<td>Analysis of MSH Target User</td>
<td>58</td>
</tr>
<tr>
<td>4</td>
<td>4.5</td>
<td></td>
<td>MSH Persona Number 1</td>
<td>59</td>
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<td>4</td>
<td>4.6</td>
<td></td>
<td>MSH Persona Number 2</td>
<td>60</td>
</tr>
<tr>
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<td>4.3</td>
<td></td>
<td>RUMM MSH List Actors and Tasks</td>
<td>62</td>
</tr>
<tr>
<td>4</td>
<td>4.4</td>
<td></td>
<td>RUMM MSH: List of Task Application/Functions/Features</td>
<td>63</td>
</tr>
<tr>
<td>4</td>
<td>4.5</td>
<td></td>
<td>RUMM Design Considerations: Navigation</td>
<td>63</td>
</tr>
<tr>
<td>4</td>
<td>4.6</td>
<td></td>
<td>RUMM Design Considerations : Layout</td>
<td>64</td>
</tr>
<tr>
<td>4</td>
<td>4.8</td>
<td></td>
<td>RUMM Design Considerations : Content/Theme/Metaphors</td>
<td>65</td>
</tr>
<tr>
<td>4</td>
<td>4.9</td>
<td></td>
<td>RUMM Design Considerations : Colour</td>
<td>66</td>
</tr>
<tr>
<td>4</td>
<td>4.10</td>
<td></td>
<td>RUMM Design Considerations : Accessibility</td>
<td>67</td>
</tr>
<tr>
<td>4</td>
<td>4.11</td>
<td></td>
<td>RUMM Example of Methodology Applied to Administrator</td>
<td>68</td>
</tr>
<tr>
<td>4</td>
<td>4.7</td>
<td></td>
<td>MSH System Actors/Tasks</td>
<td>69</td>
</tr>
<tr>
<td>4</td>
<td>4.12</td>
<td></td>
<td>Summary of Visual Mapping Exercise on MSH On-line Competition Main Likes/Dislikes</td>
<td>70</td>
</tr>
<tr>
<td>4</td>
<td>4.8</td>
<td></td>
<td>The Colour Wheel Theory</td>
<td>66</td>
</tr>
<tr>
<td>4</td>
<td>4.9</td>
<td></td>
<td>MSH System Actors/Tasks</td>
<td>69</td>
</tr>
<tr>
<td>4</td>
<td>4.10</td>
<td></td>
<td>Visual Map of MSH Expected Position versus Current On-line Competition</td>
<td>70</td>
</tr>
<tr>
<td>4</td>
<td>4.11</td>
<td></td>
<td>MSH Conceptual Sketch of Front Page: Design Documentation</td>
<td>66</td>
</tr>
<tr>
<td>4</td>
<td>4.12</td>
<td></td>
<td>MSH Storyboard for Home Page</td>
<td>67</td>
</tr>
<tr>
<td>4</td>
<td>4.13</td>
<td></td>
<td>MSH Storyboard for Gallery Page</td>
<td>68</td>
</tr>
<tr>
<td>4</td>
<td>4.14</td>
<td></td>
<td>MSH Colour Pallet</td>
<td>70</td>
</tr>
<tr>
<td>4</td>
<td>4.15</td>
<td></td>
<td>MSH Mood Board</td>
<td>71</td>
</tr>
<tr>
<td>4</td>
<td>4.16</td>
<td></td>
<td>MSH Fist Design Sketch in Dreamweaver</td>
<td>71</td>
</tr>
<tr>
<td>4</td>
<td>4.17</td>
<td></td>
<td>MSH Navigation Chart</td>
<td>72</td>
</tr>
<tr>
<td>4</td>
<td>4.12</td>
<td></td>
<td>MSH Criteria for Logo Design</td>
<td>72</td>
</tr>
<tr>
<td>4</td>
<td>4.18</td>
<td></td>
<td>Figure 4.13 MSH Agreed Artwork for Company Logo</td>
<td>75</td>
</tr>
<tr>
<td>4</td>
<td>4.13</td>
<td></td>
<td>MSH List of User Website Requirements</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td>4.14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>5.1</td>
<td></td>
<td>Webpage Layout/Implementation</td>
<td>80</td>
</tr>
<tr>
<td>5</td>
<td>5.2</td>
<td></td>
<td>MSH Physical File Structure</td>
<td>81</td>
</tr>
<tr>
<td>5</td>
<td>5.3</td>
<td></td>
<td>Screen Dump MSH Assets Horses/Images Folder</td>
<td>82</td>
</tr>
<tr>
<td>5</td>
<td>5.4</td>
<td></td>
<td>Screen Dump MSH Horses’ Folder</td>
<td>82</td>
</tr>
<tr>
<td>5</td>
<td>5.5</td>
<td></td>
<td>Examples of CSS used on MSH Website</td>
<td>83</td>
</tr>
<tr>
<td>5</td>
<td>5.6</td>
<td></td>
<td>MSH PHP Flow Chart</td>
<td>85</td>
</tr>
<tr>
<td>5</td>
<td>5.1</td>
<td></td>
<td>MSH PHP Script Files and Role Explanations</td>
<td>86-89</td>
</tr>
<tr>
<td>5</td>
<td>5.7</td>
<td></td>
<td>Code Snippet Echo</td>
<td>90</td>
</tr>
<tr>
<td>5</td>
<td>5.8</td>
<td></td>
<td>Code Snippet Maintenance State</td>
<td>90</td>
</tr>
<tr>
<td>5</td>
<td>5.2</td>
<td></td>
<td>MSH Session Variables to Preserve State</td>
<td>91</td>
</tr>
<tr>
<td>5</td>
<td>5.9</td>
<td></td>
<td>MSH Code Snippet: Connect to Database/Hitcounter</td>
<td>91</td>
</tr>
<tr>
<td>5</td>
<td>5.10</td>
<td></td>
<td>Required Function</td>
<td>92</td>
</tr>
<tr>
<td>5</td>
<td>5.11</td>
<td></td>
<td>MSH Code Snippet Example of Indentation</td>
<td>93</td>
</tr>
<tr>
<td>Section</td>
<td>Description</td>
<td></td>
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<td>MSH Screen Dump</td>
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<td>MSH Screen Dump Drop Down Box</td>
<td></td>
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<tr>
<td>5.14</td>
<td>MSH Code Snippet Dynamic Build Code Drop Down Box</td>
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<tr>
<td>5.15</td>
<td>MSH Code Snippet Displaying Horse Hands to Centimetres</td>
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<td>MSH Screen Dump of Horse Hands Converted to cms</td>
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<td>Example Gallery Layout</td>
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<td>Screen Dump Showing Vertical Tiling of Horse</td>
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<td>MSH Code Snippet File Extension Function</td>
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<td>MSH Code Snippet Use of Image Tag</td>
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<td>MSH Code Snippet Gallery Search and SQL Query</td>
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<td>5.25</td>
<td>MSH Code Snippet Search and SQL Query</td>
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<td>MSH Code Snippet String Variable</td>
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<td>Screen Dump Gallery Horse Type Selection Set</td>
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<td>Telivo Starter Plus Hosting Package</td>
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<td>Screen Dump of Column Values</td>
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<td>MSH Code Snippet SQL SubQuery</td>
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<td>Telivo ISP</td>
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<td>MSH Website Holding Page</td>
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<td>Telivo Password Protection Facility</td>
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<td>Holding Page W3C Validation</td>
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<td>Register PHP Showing Page Validation</td>
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<td>W3C CSS Validation Results for MSH</td>
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<td>MSH Homepage Screen Dump as Displayed in IE7</td>
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<td>6.5</td>
<td>MSH Homepage Screen Dump as Displayed in Firefox</td>
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<td>6.6</td>
<td>Prototype Testing</td>
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<td>7.1</td>
<td>Critical Review Overall Summary</td>
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<td>Positive and Negative Aspects Personal Performance</td>
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<td>Self Assessment</td>
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<td>Original Personal Objectives for MSH Project</td>
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<td>End of Project Status Measured Against Original Proj Spec</td>
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<td>End of Project Status Measured Against MSH Spec</td>
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<td>7.8</td>
<td>Kilpatrick's 4 Level Evaluation</td>
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<td>7.9</td>
<td>End of Project BSc Overview</td>
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<td>Final MSH Gantt Chart</td>
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APPENDIX 4B: MSH 7ps MARKETING MIX ANALYSIS

Pertinent analysis tools were used:

Internal Analysis
The Extended 7ps (Modern Marketing Mix)

This refers to price, product, personnel, promotion, physical presence, provision of service, and processes, of particularly relevance to this industry where meeting customer need is given priority. Obtaining a suitable marketing mix will enable the business to meet its marketing objectives and satisfy customer requirements.

Current situation:
- Produces stock of varying quality, fit for the needs of various groups of consumers.
- Offers a range of product to suit varying budgets/abilities, depending on the target market segment (Novice to Advanced)
- Sells the stock by word of mouth and occasionally through auctions, from a Livery Yard in the North East of England.
- Buys stock from reputable auctions predominantly in Ireland and occasionally from individual private customers
- Supports no form of product marketing and very limited advertising
- Stock is sometimes brought in for a particular customer however 90% of sales do not fall into this category.
- The majority of sales are to individual clients with 40% of sales going to businesses such as riding stables/yards.
- Stock is brought on/trained/educated then sold for a profit.
- Buys and sells a niche product, predominantly gelding Irish Sport horses for the UK market, with 15% being sold in Northern and Southern Ireland.
- Markets specifically relate to Hunters, Eventers, Show Jumpers, Dressage, and Showing.
- Purchasing and selling requires the owner to personally view the product. No purchases or sales are ever made without seeing the product.
- No sale is permitted without a valid veterinary certificate.

Opportunities
- Limited use of advertising
- No product marketing
- No link between buyers and sellers
- Limited distribution channels

Price
The product is bought in either English pounds or Euros depending upon the seller i.e. private sale or auction. Bought in stock, ranges from £2,000 to £20,000. Sold stock can range from £2,000 to £50,000 (average sale £20,000).
Product
The product relates to horses and ponies (including yearlings); variety of colours; mares or geldings; variety of heights; variety of ages (1 to 10, 4-6 year olds being the core market) and abilities (intermediate horses core market). Each will possess a passport, a show name and a pet name. Average stay: 3 months.

Personnel
Owner : W Moorhouse
Employees: Trainers, Yard Staff, Grooms, Jockies
Services : Vet, Farrier, Dentist

Promotion
The business has only ever used very traditional forms of promotion i.e. word of mouth and current customer base. Limited use of advertising is used.

Physical Presence
The business is renowned for their honestly, description and overall turnout of their stock. The business premises are professionally run with ample opportunity for a prospective buyer/seller to ride.

Provision of Service
This is a key success factor of the company and needs to be transferred to any potential on-line existence. The service of buying and selling is very specialised and within a unique niche of the market. Reputation is everything. A number of customers are regular buyers and sellers however this business cannot support all the regular clientele’s requirements. All personnel involved are professional and offer the best possible service.

Process
The process of the business has not changed over many years. The owner deals with all complaints (very few being received), customer needs are stored in his head so potentially can be forgotten, order is processed the same as it has always been.

Walk Through The Business Process
- Owner goes to view potential product. (On average only 1 purchase is made to every 20 viewings). Customers who come to buy, figure reduces to 1 sale for every 3 viewings. This is due to the professional and accurate personal service given to the customer as opposed to the poor descriptions given by personal sellers and the huge number of horses viewed at an auction.

- All sales are personally viewed, very time consuming and costly process (average buying time 6 hours, equates to travelling/viewing. Average selling time 9 hours).

- Purchases horse/pony from breeder/sale (personal/auction). Payment is always required immediately. Statutory purchasing rights apply of 28 days.

- All Purchases subject to veterinary inspection (shows soundness of heart, wind and action), rarely bought sold as seen. Usual age 3 / 4 years old.
- Either fly/drive to purchase stock with many private viewings not culminating in a sale.

- Auctions take place 1 to twice per month purchasing normally 2 / 4 per visit, requiring costs associated with travelling to Ireland and overnight accommodation.

- Bought in euros, selling price plus commission

- Transported back to uk, delivery costs and 3 day delivery the norm.

- Product is ridden, trained and cared for. Kept on average for 3 months
- All stock is for sale from the day it is purchased, depending upon the price offered.

- Average profit £4,000

- Average costs 5-6 k to 15k

- Costs relate to Feed, exercise, transport, vets fees, competition fees, riders fees, stabling, misc

- Sales out are word of mouth and customer sales, word of mouth, no advertising

- All customer details stored by owner on mobile phone/head
APPENDIX 1: LIST OF ABBREVIATIONS/SPECIAL TERMS

The following is a list of abbreviations and specialised vocabulary used in the Final Year Project Report for Moorhouse Sporthorses.

JCEE   Java 2 Platform, Enterprise Edition
FTP   File Transfer Protocol
PC   Personal Computer
HTTP   Hyper Text Transfer Protocol
ASP   Active Server Pages
BBC   British Broadcasting Corporation
BCS   British Computer Society
BHS   British Horse Society
BSc   Bachelor of Science
BSJA   British Show Jumping Association
BSPS   British Show Pony Society
CASE   Computer Aided Software Engineering
CRM   Customer Relationship Management
CSS   Cascading Stylesheet
DBMS   Database Management System
DDA   1995 Disability Discrimination Act
DEFRA   Department for Environment, Food and Rural Affairs
DFD   Data Flow Diagrams
ERD   Entity Relationship Diagrams
FOLDOC   Free On-line Dictionary of Computing
GUI   Graphical User Interface
HIS   Hunter Improvement Society
ICT   Information and Computing Technology
ISP   Internet Service Provider
JS   JavaScript
MSH   Moorhouse Sporthorses
PARC   Proximity, Alignment, Repetition, Contrast (Design Principle)
PHP   Hypertext pre-processor. Recursive acronym
PK   Primary Key
PRINCE   PRojects In Controlled Environments
RAD   Rapid Application Development
RAM   Random Access Memory
RMM   Relationship Management Methodology
RUMM   Rapid User Modelling Method
SDLC   System Development Lifecycle
SDM   System Development Methodologies
SQL   Structured Query Language
SWM   Simple Web Method
SWOT   Strengths, Weaknesses, Opportunities, Threats
UCWD   User Centered Web Development
UK   United Kingdom
UML   Unified Modeling Language
WAI   Web Accessibility Initiative
WAP   Wireless Application Protocol
WC3   World Wide Web Consortium
WCAG   Web Content Accessibility Guidelines
Specific Vocabulary

Yearling: Relates to a foal, one year of age (all equine stock having birthdays on the 1st of January in any given year of birth)

Hands: Unit of measurement 1 hand = 8 inches

Show Name: Official Name given on the Horse Passport

Pet Name: Name given to the animal at home
APPENDIX 2: BSc COMPUTING PROJECT PROPOSAL FORM

PROJECT TITLE: MOORHOUSE SPORTHORSES MANAGEMENT SYSTEM

PROPOSER: MOORHOUSE HORSEBOXES (MR. W. MOORHOUSE)

From: Mrs. C. Moorhouse
Email: D4909514@tees.ac.uk

Submit To: MANSHA NAWAZ
Email: m.nawaz@tees.ac.uk

SUBMISSION DATE: 24 May 2007

HARDWARE: PC Pentium 4
SOFTWARE: Macromedia Dreamweaver, Macromedia Flash, PHP, MySQL, Adobe Photoshop

KEYWORDS Website, Database, Multi-media, Interactive, Management System

PROJECT DESCRIPTION:

To develop an interactive Web Based Management System to support and extend the potential market and company operating procedures for a well established Sport Horses business (Sport Horses).

The system will:

- Provide a facility to register potential and existing Customers and login securely
- Enable Customers to record their horse requirements as well as their current horse profiles
- Collect and centrally store Customer/product and marketing data
- Enable a workable stock and costing system to be introduced
- Offer a searchable gallery of horses
- Propose useful user Management features

The data needs to be entered onto a central database so an individual customer related portfolio can be produced and maintained.

The system will need to incorporate a high degree of confidentiality and security to maintain customer privacy.

Instructions:
Email proposal to project co-ordinator m.nawaz@tees.ac.uk
Email proposal as a MS Word document with the file name format pp.surname.initials.doc
APPENDIX 3: BSc PROJECT SPECIFICATION FORM

PROJECT TITLE: MOORHOUSE SPORTHORSES MANAGEMENT SYSTEM
PROPOSER: MOORHOUSE HORSEBOXES (MR. W. MOORHOUSE)
From : Mrs. C. Moorhouse
Email: D4909514@tees.ac.uk
Submit To: MANSHA NAWAZ
Email : m.nawaz@tees.ac.uk
SUBMISSION DATE: 24 May 2007
HARDWARE: PC Pentium 4
SOFTWARE: Macromedia Dreamweaver, Macromedia Flash, PHP, MySQL, Adobe Photoshop
KEYWORDS Website, Database, Multi-media, Interactive, Management System, Consultancy, Accessibility

PROJECT DESCRIPTION:

To develop an interactive Web Based Management System to support and extend the potential market and company operating procedures for a well established Sport Horses business (Sport Horses).

The business does not currently rely on any information technology solutions and consequently has a limited market and market opportunities, as advertising and market research is not truly possible on a wide-scale.

Objectives:
The main objective of this project is to produce an interactive web-based management system to underpin the existing business processes and to expand the potential market.

The proposal is to provide the following services:
- Facility to register potential and existing Customers and login securely
- Enable Customers to record their requirements as well as their current individual profiles
- Collect and centrally store Customer/Product and Marketing Data
- Enable a workable stock and costing system to be introduced
- Offer a searchable gallery of stock
- Propose useful user Management features
- Promote company’s image and reputation in a different medium

The service needs to operate in a secure and confidential manner to maintain customer confidence and uphold the business reputation.
**Product Aims:**
The data needs to be entered onto a central database so an individual customer related portfolio can be produced and maintained. The information may contain textual, graphical or potentially multi-media video files.

The system will need to incorporate a high degree of confidentiality and security to maintain customer privacy. It will also be dynamic and provide a “rich user experience” to keep the existing and potential clients interested and coming back for more.

**Academic Aim:**
Academically, the aim is to fulfil the requirements of the BSc Part-Time Computer Studies Degree Project, by utilising various skills attained during the course of study and to develop and stretch personal capabilities to fulfil project requirements. This will be achieved by combining: the web creation skills gained during academic course of study; drawing from personal and business experience; acquiring and learning new skills; and employing a number of methodologies to help provide structure for the project.

The proposed methodologies to be used are Rapid User Modelling Model Methodology (RUMM Andrew Bingham) and User Centered Web Development (Jonathan Lazar).

**Resources & Constraints:**
The proposal is to maximise and develop resources whilst minimising on perceived constraints. Resources available will include utilising past experience to determine the best feasible web solution using PHP as the web scripting language and MySQL as the database platform. Adobe DreamWeaver and Flash will be used to aid development and enhance the final product. Constraints may include the current skill set available along with the Project and Client time/costing constraints.

**Schedule:**
It is intended that all stages of the project will be completed within the time scales of 44 weeks. The approximate schedule is – Analysis (10 weeks), Conceptual and Technical Design (22 weeks), Evaluation, Reviewing and Testing (10 Weeks), Training and Implementation (2 Weeks) with Documentation to be completed over the 44 week period.

**Instructions:**
Email proposal to project co-ordinator m.nawaz@tees.ac.uk
Date Sent : 15 June 2007
APPENDIX 4A: FEASIBILITY STUDY FOR MSH CONDUCTED BY C MOORHOUSE (26 JUNE 2007)

A brief analysis of current business systems and practices determined whether a suitable digital strategy (Business Management System) could be recommended to fulfil the requirements for the Final Year Project for the University of Teesside.

A summary of the findings are listed below:

Need Analysis
A Need Analysis was undertaken with the client to determine the project outline and clients' requirements.

The following questions were answered:

What is the end deliverable?
Moorhouse Sporthorses are looking to obtain a solution to improve their business and update their practices to move it forwards and secure their future. The proposed solution would be to offer a Business Management System, utilizing an e-commerce website.

What purpose will it serve?
Main objectives of the project are to:

- widen the current sales distribution channel
- improve customer satisfaction
- keep the company in business, moving with customer expectation
- incorporate a financial costing system
- Design a corporate image for the company, including a logo

External Analysis
There is a growing market for the sports and leisure industries, with an added impetus due to the impending Olympic Games being held in London. The company has a solid customer base but has not taken advantage of an on-line presence and is loosing market share. There are many rules and regulations regarding this industry but nothing initially uncovered to prevent the project from going ahead and improving the overall company.

What standards will we be measured against?
No problems are foreseen in being able to comply with the current standards and legislation with regard to moving their business on-line and conforming to the legal requirements of bodies such as Defra, WC3, WAI, and the Disability Discrimination Act 1995.

What are the quality requirements?
Initial research indicates customers need a reputable and secure personal quality service, customer requirements which can be transferred to an on-line presence.
What carry over work can we expect?
A basic list of requirements was agreed with the client as being feasible in the timescale allowed, however, as the Project develops, future areas of development will be indicated and advised to the client. It was agreed no penalty clauses would be incurred and all work would be undertaken by C Moorhouse. The company agreed to provide timely information and resources.

Technical Feasibility Study
The company has “in-house”: personnel, hardware and software to manage and run the proposed database driven website.

Schedule Feasibility Study
Based upon the initial outline specification, the timescale of the project is deemed as achievable, subject to unforeseen circumstances. It was agreed all work will not interfere with the current running of the business. Should the project overrun, mutual agreement would be made for all work to be completed as per the scope of the project along with the agreed set of requirements.

Legal Feasibility
It was agreed that any work produced for the company will be in accordance with current legislation.

Economic Feasibility
Initial research indicated a potential increase in customer base of 20% within the first year. This equates to a potential increase in sales of 10%. Customer satisfaction is also estimated to improve by 40%, providing existing customers additional useful features. As the project does not have a financial costing, the company is guaranteed to improve their financial standing.

Operational Feasibility
Research of current practices and procedures indicates the company will greatly benefit from formalizing their current structure, improving knowledge of current customers, capturing requirements, utilizing this information to buy more appropriate stock and sell more stock as a consequence. By offering a financial database, the company can also improve their overall profitability by introducing an IT and web element.
### Overview/Deliverables for Part-Time Project BSc Computer Studies 2007/2008: C Moorhouse

<table>
<thead>
<tr>
<th>Deliverable</th>
<th>Date/Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Specification</td>
<td>To be agreed with Supervisor 24/05/07 Draft</td>
</tr>
<tr>
<td>Ethical Release Form</td>
<td>To be agreed/signed by Supervisor End May 2007</td>
</tr>
<tr>
<td>Product of Project</td>
<td>Minimum of at least one artefact 28/02/2008</td>
</tr>
<tr>
<td>Project Diary</td>
<td>Diary detailing work undertaken during Project sealed envelope 28/02/08</td>
</tr>
</tbody>
</table>

### Deliverables

<table>
<thead>
<tr>
<th>Number</th>
<th>Deliverable</th>
<th>Date/Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2 x bound copies Project Report</td>
<td>4pm 28/02/08 to Oasis</td>
</tr>
<tr>
<td>2</td>
<td>1 x copy Project Diary</td>
<td>&quot;</td>
</tr>
<tr>
<td>3</td>
<td>4 x copies Executive Summary</td>
<td>&quot;</td>
</tr>
<tr>
<td>4</td>
<td>2 x copies Project Report, Executive Summary and all electronic artefacts</td>
<td>4pm electronic 28/02/08</td>
</tr>
<tr>
<td>5</td>
<td>Viva/Product Presentation</td>
<td>W/c 24/03/08</td>
</tr>
</tbody>
</table>

Signed: ...........................................  
Date: ...........................................
## AMENDED OVERVIEW AND DELIVERABLES
FOR PART-TIME PROJECT BSC COMPUTER STUDIES 2007/2008: C MOORHOUSE

### AMENDED OVERVIEW OF DELIVERABLES (AS AT 24 JANUARY 2008)

<table>
<thead>
<tr>
<th>Item</th>
<th>Detail</th>
<th>Date/Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Specification</td>
<td>To be agreed with Supervisor</td>
<td>24/05/2007</td>
</tr>
<tr>
<td>Ethical Release Form</td>
<td>To be agreed/signed by Supervisor</td>
<td>End May 2007</td>
</tr>
<tr>
<td>Report of Process</td>
<td>Bound Report (See Report Layout Document for details) \ including Analysis, Design, Implementation, Evaluation approx 10,000 words (not including appendices)</td>
<td>21/04/2008</td>
</tr>
<tr>
<td>Product of Project</td>
<td>Minimum of at least one artefact</td>
<td>21/04/2008</td>
</tr>
</tbody>
</table>

### AMENDED DELIVERABLES (AS AT 24 JANUARY 2008)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>2 x bound copies Project Report</td>
<td>10am 21/04/2008 to Oasis</td>
</tr>
<tr>
<td>2</td>
<td>2 x electronic copies Project Report, and all electronic artefacts</td>
<td>10am electronic 21/04/08</td>
</tr>
<tr>
<td>3</td>
<td>Viva/Product Presentation</td>
<td>22/04/2008 - 16/05/2008</td>
</tr>
</tbody>
</table>

Signed: ……………………………….. Date: ………………….
## APPENDIX 5C: MSH CLIENT PROJECT DELIVERABLES (26/06/07)

**OVERVIEW OF DELIVERABLES FOR MOORHOUSE SPORTHORSES**  
**AS AT 26 JUNE 2007 : PRODUCED BY C MOORHOUSE**

<table>
<thead>
<tr>
<th>Item</th>
<th>Detail</th>
<th>Date/Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prototype Website</td>
<td>Develop and present a Prototype Website</td>
<td>21/04/2008</td>
</tr>
<tr>
<td></td>
<td>conforming to MSH/legal requirements</td>
<td></td>
</tr>
<tr>
<td>Logo</td>
<td>Project will design a suitable company logo</td>
<td>12/01/2008</td>
</tr>
<tr>
<td>Training</td>
<td>Provide training to MSH Administrator</td>
<td>w/c 31/03/2008</td>
</tr>
<tr>
<td>User Guide</td>
<td>Produce and hand over a User Guide</td>
<td>21/04/2008</td>
</tr>
</tbody>
</table>

Signed MSH : ........................................ Signed C Moorhouse : ................................. Date: .............................
## DRAFT PROJECT SCHEDULE FOR
PART-TIME PROJECT 2007/2008 : C MOORHOUSE
Start Date : 26 April 2007 : Based on 44 Weeks

<table>
<thead>
<tr>
<th>Activity</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>July</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
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</thead>
<tbody>
<tr>
<td>Agree Specification</td>
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<tr>
<td>Supervisor Submit Ethical Release Form</td>
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<td>Analysis</td>
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<tr>
<td>Conceptual Design</td>
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<td>Technical Design</td>
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<tr>
<td>Evaluation/Review/Revision/TestMarket</td>
<td></td>
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<tr>
<td>Training and Implementation</td>
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<tr>
<td>Submit Final Report/Abstract</td>
<td></td>
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<tr>
<td>Viva/Presentation of Product</td>
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</tbody>
</table>

Start Date: 26 April 2007
Based on 44 Weeks
## ATTACHMENT 7A: DETAILED PROJECT SCHEDULE: MOORHOUSE SPORHTHORSES BUSINESS MANAGEMENT SYSTEM
### As At 24 April 2007

### PROJECT INTRODUCTION
- Project Proposal
- Feasibility Study
- Project Specification
- Planning & Scheduling

### SYSTEMS ANALYSIS
- Statement of Purpose
- Requirements List
- Context Diagram
- Events List
- Data-flow Diagrams
  - Top Level
  - Low Level

### SYSTEMS DESIGN
- Design Specification
- Data Dictionary
- Entity Relationship Diagrams-Physical ERD
- Conceptual Design
- Physical Design

### DRAFT REPORT
- Week 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 1
- 2
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- 4
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- 8
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- 44

### IMPLEMENTATION
- Database/PHP
- Web Design
- Evaluation
- Review
- Testing
- User Guide
- Handover/Training

### PROJECT REPORT

| Date       | 24/04/07 | 01/05/07 | 08/05/07 | 15/05/07 | 22/05/07 | 29/05/07 | 05/06/07 | 12/06/07 | 19/06/07 | 26/06/07 | 03/07/07 | 10/07/07 | 17/07/07 | 24/07/07 | 31/07/07 | 07/08/07 | 14/08/07 | 21/08/07 | 28/08/07 | 04/09/07 | 11/09/07 | 18/09/07 | 25/09/07 | 02/10/07 | 09/10/07 | 16/10/07 | 23/10/07 | 30/10/07 | 06/11/07 | 13/11/07 | 20/11/07 | 27/11/07 | 04/12/07 | 11/12/07 | 18/12/07 | 25/12/07 | 01/01/08 | 08/01/08 | 15/01/08 | 22/01/08 | 29/01/08 | 05/02/08 | 12/02/08 | 19/02/08 |
|------------|---------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Week       | 1       | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        | 10       | 11       | 12       | 13       | 14       | 15       | 16       | 17       | 18       | 19       | 20       | 21       | 22       | 23       | 24       | 25       | 26       | 27       | 28       | 29       | 30       | 31       | 32       | 33       | 34       | 35       | 36       | 37       | 38       | 39       | 40       | 41       | 42       | 43       | 44       |
**SCHOOL OF COMPUTING - PROJECT DIARY – SUPERVISOR MEETINGS**

**Student Name**: Christina Moorhouse  
**Supervisor/2nd Reader**: Mansha Nawaz, Robert Duckers  
**Project Title**: Part-Time Project BSc Computer Studies 2007/2008  
**Minutes from Meeting**: Friday 25 May 2007

1. **GENERAL INTRODUCTIONS**

2. **ITEMS RAISED BY SUPERVISOR**

   2.1 Supervisor outlined Project expectations. M Nawaz went through links to website resources.  
      Note HP1 and HP2 complete as one

   2.2 Supervisor agreed that proposed specification was acceptable, however, suggested the possibility of opening the Project up to make the Project suitable for any Generic Small Business, using Sport Horses as a test case. C Moorhouse to explore this possibility.

3. **PROJECT DIARY : C MOORHOUSE**

   C Moorhouse went through all the work completed from the beginning of the Project. All completed work emailed to Supervisor prior to the meeting i.e.  
   - Project Diary  
   - Project Proposal  
   - Project Specification  
   - Agenda  
   - Overview/Deliverables  
   - Draft Project Schedule  
   - Possible Project Ideas

   All work agreed as being suitable with Overview/Deliverables signed off.

   3.1 Draft Project Proposal/Specification shown and agreed.

   3.2 Matters to Discuss/Questions

      - PALs same as diary

   3.3 Confirm Project Overview/Deliverables

4. **ANY OTHER BUSINESS**

   4.1 C Wagstaff agreed an extension to the Project Specification, with a hand-in date of 15 June 2007.

   4.2 Work to Do For Next Meeting
      - look at possibility of changing Project to a Generic Small Business System
      - develop and expand the draft Project Schedule

5. **DATE AND TIME OF NEXT MEETING**

   5.1 Next meeting to be advised by M Nawaz (approx 2 weeks) so Project Specification can be finalised before the hand-in date.

**Resources Required**:  
- Project Diary April to May 2007 by C Moorhouse  
- Links from Project Coordinator University of Teesside Project Handbook 2006/07  
- Links from Project Supervisor  
- Personal Research including Process for Project Justification  
- Project Overview/Deliverables

**Produced By**: C Moorhouse
Client Meeting Minutes

Venue: Offices at Moorhouse Sporthorses
Date: 3 July 2007
Time: 2pm – 3pm
Attendees: Mr W Moorhouse (Managing Director)
           Mr J Brown (Senior Administrator)

1. **Items Arising From Last Meeting**

C Moorhouse recapped the position from the first initial meeting and gave the Client a chance to pose any questions. At this stage the Client did not have any particular questions.

2. **Items To Discuss**

C Moorhouse presented the findings of the Feasibility Study and initial analysis on Project viability.

They were pleased at the amount of information collated and were enthusiastic to start work.

Jointly a draft schedule was put together on timings of the project and time available for meetings, setting out this plan well in advance as MSH were a very busy company with many commitments.

MSH agreed to provide the premises and suggested that the best form of contact would be via the telephone.

The company were very happy with the progress made and were tasked to pull together company media and ideas for their website.

C Moorhouse agreed to also bring some ideas, sketches and colour palettes to discuss, plus a laptop to show MSH what would be their current on-line competition.

3. **Date and Time of Next Meeting**

4th August 2pm, Moorhouse Sporthorses Offices

Copy: All Correspondence to Client
<table>
<thead>
<tr>
<th>Task No</th>
<th>Description of the Activity</th>
<th>Description of where Evidence of the Activity undertaken/completed will be/is located</th>
<th>Estimated Completion Time</th>
<th>Actual Completion Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Review project web site &amp; web resources</td>
<td>Extensive Research undertaken on M Nawaz internet site, making reference to his site and that of D Eagle, Project Supervisor</td>
<td>6 days</td>
<td>6 days</td>
</tr>
<tr>
<td>2</td>
<td>Research project ideas</td>
<td>Looked at various ideas to source own Final Year Project to complete a Project which would be meaningful</td>
<td>1 week</td>
<td>1 week</td>
</tr>
<tr>
<td>3</td>
<td>Draft project proposal</td>
<td>pp.surname.initial.doc  Work to be given to MN for approval</td>
<td>4 days</td>
<td>4 days</td>
</tr>
<tr>
<td>4</td>
<td>Draft project specification</td>
<td>ps.surname.initial.doc – Work to be given to MN by 24/5/07</td>
<td>2 weeks</td>
<td>2 weeks</td>
</tr>
<tr>
<td>5</td>
<td>Review British Computer Society Web site</td>
<td>BCS Code Of Conduct &amp; BCS Code Of Practice</td>
<td>1 day</td>
<td>1 day</td>
</tr>
</tbody>
</table>

**Review of Project Progress:**

**Project Progress todate has been ahead of scheduled, with all planned work completed**

**Matters to discuss (problems):**

Obtain feedback on draft proposal and choice of company sourced from my own contacts. Reviewed the next stage with Project Supervisor and to consider possible methodologies

**Report on Previous meeting:**

*n/a*

**References Consulted:**

project web site and additional resources indicated on site [www.bcs.co.uk](http://www.bcs.co.uk)

**Work done this week:**

Handed in Draft Project Proposal for basic consideration

**Any other matters arising:**

No other matters arising at this stage
<table>
<thead>
<tr>
<th>Task No</th>
<th>Description of the Activity</th>
<th>Description of where Evidence of the Activity undertaken/completed will be/is located</th>
<th>Estimated Completion Time</th>
<th>Actual Completion Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Review project web site &amp; web resources</td>
<td>Personal Research, helped in preparation of Project Deliverables, and entire Project Report</td>
<td>2 days</td>
<td>2 days</td>
</tr>
<tr>
<td>2</td>
<td>Research project ideas</td>
<td>Shown documentation to Project Supervisor</td>
<td>1 week</td>
<td>1 week</td>
</tr>
<tr>
<td>3</td>
<td>Draft project proposal</td>
<td>pp.surname.initial.doc</td>
<td>1 day</td>
<td>1 day</td>
</tr>
<tr>
<td>4</td>
<td>Draft project specification</td>
<td>ps.surname.initial.doc</td>
<td>1 day</td>
<td>1 day</td>
</tr>
<tr>
<td>5</td>
<td>Review British Computer Society Web site</td>
<td>BCS Code Of Conduct &amp; BCS Code Of Practice</td>
<td>1 day</td>
<td>1 day</td>
</tr>
<tr>
<td>6</td>
<td>Setting up personal computer for dissertation i.e. folders, style sheets, adopting consistency of font, sizes, footers, references etc</td>
<td>2 days</td>
<td>2 days</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Gantt Chart</td>
<td>Appendix ?? Detailed Project Schedule</td>
<td>1 day</td>
<td>1 day</td>
</tr>
<tr>
<td>8</td>
<td>Abstract</td>
<td>Page ii of Report</td>
<td>1 day</td>
<td>1 day</td>
</tr>
</tbody>
</table>

**Review of Project Progress:**

*Project going to schedule.*

**Matters to discuss (problems):**

Proposal and Specification agreed. Next stage reviewed with supervisor. Father died

**Report on Previous meeting:**

n/a

**References Consulted:**

project web site and additional resources indicated on site [www.bcs.co.uk](http://www.bcs.co.uk)
[www.tees.ac.uk](http://www.tees.ac.uk) Project Website and Mansha Nawaz Website

**Work done this week:**

See above

**Any other matters arising:**
MSH QUESTIONNAIRE TO CURRENT CUSTOMERS: May 2007

1. HAVE YOU EVER SEARCHED THE INTERNET TO SELL/BUY HORSES/ Ponies?

2. DO YOU HAVE A PREFERRED WEBSITE WHICH YOU USE?

3. IF SO WHAT FEATURES DO YOU LIKE/DISLIKE?

4. WHAT IS PREFERRED SEARCH ENGINE TO FIND INFORMATION?

5. DO YOU USE SPONSORED LINKS AT LEFT hand SIDE OF GOOGLE?

6. WHAT INFORMATION WOULD YOU EXPECT TO SEE?
7 WOULD YOU USE A WEBSITE FOR MOORHOUSE SPORTHORSES?

8 WHAT SERVICES WOULD YOU LIKE THE WEBSITE TO OFFER /SOMETHING THAT IS NOT CURRENTLY AVAILABLE?

9 HOW WOULD YOU RATE YOUR LEVEL OF COMPUTER LITERACY?
    Novice / Average / Advanced Experience:

10 IN WHICH AGE GROUP ARE YOU?

11 DO YOU OWN/USE A COMPUTER OR HAVE CHILDREN WHO USE THE INTERNET/ INTERESTED IN HORSES/PONIES, SITES USED?

12 ARE YOU A?
    Rider / Buyer / Seller / Supplier / Employee

13 DO YOU HAVE ANY OTHER INTERESTS?

14 HOW MANY HORSES/PONIES HAVE YOU BOUGHT/SOLD?

15 WHAT DO YOU RATE AS IMPORTANT FEATURES? (Security/Personal Service/Reputation/Credibility/Price etc)

16 HAVE YOU EVER REGISTERED YOUR DETAILS WITH A WEBSITE?

17 WHAT METHODS HAVE YOU USED TO BUY/SELL STOCK?
18 DO YOU USE/OWN A MOBILE PHONE?

Thank you for your time. It is very much appreciated.
### APPENDIX 12: RESULT SUMMARY OF COMPETITOR VISUAL MAP EXERCISE

#### www.horseandhound.co.uk

<table>
<thead>
<tr>
<th>Website Likes</th>
<th>Website Dislikes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Consistent Navigation</td>
<td>1. Too much information</td>
</tr>
<tr>
<td>2. Good Horse Gallery</td>
<td>2. Too many distractions, flashing bits</td>
</tr>
<tr>
<td>3. Good News Section</td>
<td>3. Text too small</td>
</tr>
<tr>
<td>4. Appealing Clear Banner</td>
<td>4. Pages take too long to load</td>
</tr>
</tbody>
</table>

#### www.irish-horses.com

<table>
<thead>
<tr>
<th>Website Likes</th>
<th>Website Dislikes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Some nice thumbnail images</td>
<td>1. Poor use of space on front page</td>
</tr>
<tr>
<td>2. Good Testimonials Page</td>
<td>2. Poor navigation/loading times</td>
</tr>
<tr>
<td>3. White backgrounds good</td>
<td>3. Google Ads</td>
</tr>
<tr>
<td>4. Register Users Page</td>
<td>4. Not easy to get to sport horse gallery</td>
</tr>
</tbody>
</table>
### Website Likes

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. White background</td>
<td>1. Flashing, moving images</td>
</tr>
<tr>
<td>2. Contrasting background/foreground</td>
<td>2. Navigation and layout unclear</td>
</tr>
<tr>
<td>3. Good graduating background colour</td>
<td>3. Pages slow to load</td>
</tr>
<tr>
<td>4. Plenty of stock for sale</td>
<td>4. Too much information</td>
</tr>
</tbody>
</table>

### Website Dislikes

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Flashing, moving images</td>
<td>1. Poor navigation</td>
</tr>
<tr>
<td>2. Navigation and layout unclear</td>
<td>2. Poor front page</td>
</tr>
<tr>
<td>Website Likes</td>
<td>Website Dislikes</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>1. Nothing</td>
<td>1. Too much information</td>
</tr>
<tr>
<td></td>
<td>2. Poor choice of colours</td>
</tr>
<tr>
<td></td>
<td>3. Poor + small navigation</td>
</tr>
<tr>
<td>4. Poor Gallery</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Website Likes</th>
<th>Website Dislikes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Login Feature</td>
<td>1. Small navigation links/text size</td>
</tr>
<tr>
<td>2. Good Images</td>
<td>2. Too much information</td>
</tr>
<tr>
<td>3. Clear Enquiry Form</td>
<td>3. Don’t like moving text</td>
</tr>
<tr>
<td>4. Good Gallery</td>
<td>4. Lot of wasted space</td>
</tr>
</tbody>
</table>
1 Launch/Open Website

To log on to MSH website, you will need to point your web browser to:

http://www.moorhousesporthorses.co.uk as shown below

You will be presented with a webpage which will look like the following:

This page is known as the “Home” or “Index” page
2 Types of User and Overview of Website Features

The website has a number of features available to users. A user can be non-registered or registered.

The difference between the two is that there are a lot more useful benefits available to a registered user.

2.1 Non-Registered Users have access to the following features:

2.1.1 Home Page/Return to Home Page
2.1.2 Browse/Navigate the website (limited to basic gallery viewing details for Unregistered User)
   2.1.2.1 In Page Links – on Long Pages
   2.1.2.2 Drop Down Boxes
2.1.3 View Current Date and Time (located at top right hand corner of website)
2.1.4 Search for horses based on Colour and Type fields
2.1.5 Links to other useful websites
2.1.6 Email MSH
2.1.7 View Site Map
2.1.8 Provides Answers To Frequently Asked Questions
2.1.9 Register

2.2 Registered Users have the following additional features:

2.2.1 Additional Facilities Offered to Registered Users
2.2.2 View the horse gallery (Buy)
2.1 **Non-Registered Users**

2.1.1 **Home Page**

The home/index page can be viewed by:

1. Clicking once on the link “Home” (located on the top navigation bar) or
2. By clicking on the Moorhouse Sporthorses Banner (located on the top of the page).

This will always redirect your browser back to the “Home Page”.

The picture below indicates the positioning of the Home Navigation Link. To enable you to see that this is a link, the pointer will change to a hand when you are in the right position and the word “Home” with changed colour to yellow.

As you move your mouse pointer over the word “Home”, the pointer will change to indicate a navigation link.

It will change from a Pointer changes to

![Click Once.](image-url)
2.1.2 Browse/Navigate

To move from one page to another, the same process is required throughout the entire website. The mouse pointer will change to show an area is interactive.

There are 3 types of site navigation i.e.

1. Accessibility
2. Primary
3. Secondary

2.1.2.1
In Page Links On Long Pages

If a page has a lot of information, to help you navigate through the information, in page links have been used.

This is an example of the Privacy Page. Links are indicated by the underline.

If you click on a link such as Children’s Policy, this will take you directly to the information.

At the bottom of the page, there is also a Return To Top of Page facility if you click on this link, it will take you back to the top of the webpage.
2.1.2.2 **Drop Down Boxes**

Drop down boxes are used throughout the site to help you.

The following is an example of the drop down feature being used on the news items on the Index Page

![Image](image_url)

Simply click on the arrow to gain more options
2.1.3 Date/Time

Whilst working on the website, a useful and interesting feature is the date and time, always displayed at the top right hand corner of the website.

This feature can be viewed in the top right-hand corner.
2.1.4 Search for horses based on Colour and Type fields

Should you wish to search for a particular horse or pony, a searchable feature is available on the Horse Gallery Page, through the “Buy” navigation link.

This allows you to search on colour and also type.

Once your selection is made, the information is displayed automatically i.e. in the following example a “Palamino” and “Pony” was requested.
2.1.5 Links To Other Useful Sites

MSH have provided a number of links from their website to other useful sites.

To follow a link, click on it e.g. W3C Web Content Accessibility Guidelines
A link is indicated by the underline

The site is then launched in a separate browser window

To leave the visited site, just click on the red x in the right hand corner.
2.1.6 E-Mail MSH

To E-mail MSH can be achieved by:

- Clicking on Call Us on the Top right Navigation Bar
- Using Contact Us on the bottom bar
- Or Contact Us from the Top Accessibility Navigation Bar

This screen shows basic company information, name, address, and telephone number and email link. By clicking on the link, this opens up another window to send MSH an email.
2.1.7 Provide Answers to Frequently Asked Questions (FAQ)

MSH is always there to help.

They provide an on-line page by clicking on Help on the bottom navigation bar.

The following page will be displayed.
2.1.8 View Sporthorse News

MSH has a range of News Articles and as a user you have the choice of what you would like to see by clicking on the down arrow next to the news items at the bottom of the page.

You can choose to view all news of the last 60 days.

By clicking on the last 60 days you may get something like the following.
2.1.9 Register with MSH

To register your details with the MSH Website to gain additional and valuable website features please register. It is a very simple process, achieved by following the steps below:

1. Click on Register

2. Fill in User Details i.e. all the boxes that are left blank, the following is an example of the E-mail field, which is a compulsory field.

Please enter, all the fields in the User Details Registration Form (example below), marked with a red asterisk (compulsory) i.e. E-mail, password etc.

Some fields are discretionary but are helpful.

At this point we would like to assure all users that we do not pass on our clients’ details to any third party and have strict guidelines on storing customer information.
The drop down feature of a combo box, has been added to make things simpler in the Country field. Either click on the downward arrow, or if you feel you want to type in the initial letter, then the word will be automatically put in for you. E.g. of you type E, England will be displayed.

The common use of tab moves the cursor to the next field

If a field has not been filled in correctly, an information box will appear to give further instructions i.e. in this case; the required telephone field has been left blank

When form is complete
Click on save
Located at the bottom on the form

Feedback will be given to the user that registration has been successfully completed with a thank you for registering message indicating details of your account have been sent to your email address for future reference.

This will be the view from your registered email box
A message similar to the one below will be sent to your email account for future reference.
2.1.10 Login

Login is another way of saying enter the site. The login process for MSH is quick and simple.

Enter your registration details i.e. email address and password into the required fields in the login box.

Next click on Register.

2.1.10.1 Successful Login

If login is successful, you will expect to see a screen similar to the following:
The screen will change. The login box will now show Current User and logged in name and the main screen will give a Welcome message.

2.1.10.2 Un-Successful Login

This will give you a login failed error message in the login box.

If this happens, please try the following:
1. Login your details again, just to check that you have not made a typing error.
2. If login still says failed, please go to your confirmation email to check username and password details and try to login again.
3. If login still says failed, click on Forgot Password link.
The following page will be displayed to the user:

Please enter your e-mail address

Then click on send reminder box

The following page will then be displayed to you
Explaining that your password has been e-mailed to you.
It also gives you a contact us link
2.2 Registered Users

2.2.1 Highlight Of The Month

A special feature of Highlight of the Month depicts the latest horse/pony. To find out details about this horse/pony, simply click on the image under the heading. This takes you to a screen with a lot more detail. On this screen you have the option to go back, using the back button or to express interest in the horse.
2.2.2 To Express Interest / To make An Enquiry

Express interest screen shows how you as the user can enter an Offer Price if you wish or comments or questions relating to the product.

By clicking Express Interest, you have sent an email to MSH, to which you will get an immediate response with your own enquiry number.
2.2.3 Buy/Show Horse Gallery

There is not a facility to buy, but this terminology is easily recognised to equestrian users as to look at the Gallery of Horses.

Clicking on Buy takes you to the Gallery page

On this page you have options to click more details

If you click on the image itself, the picture will enlarge and be presented in another window
Floitard
Irish Sport Horse
Name: Floitard
Height: 16 hands 3 inches (178cm)
B/O Year(s): 2005
F/P/O/A: A/P/A
Favourite: Polo
Ponal Fantasy
Little Nibble

Excellent all round show horse.

www.moorhousesportshorses.co.uk
Call Us: +44 (0) 12497 280015

Moorhouse
SportHorses

Current Issue
Log in
Register
Call to Action

Accessibility
http://files/moorhousesportshorses/images/three/36.jpg
Windows.png

http://files/moorhousesportshorses/images/three/36.jpg

Copyright 2008-2009
Moorhouse Sport Horses

Logging Out
Accountability / Help / Site Map / Privacy / Terms & Conditions / Disclaimer / Contact Us

Version 1: (18 April 2008)
2.2.4 Sell

Clicking on Sell will take you to the following page
Where you can fill in your details and we will sell your horse/pony
For you

This form is filled in exactly the same as previous forms.

Should you have any queries or amendments, please feel free to call or email us
and we will amend the next copy of the User Guide.

Many thanks