

A virtual field hospital for military nurses

A thesis

by

Marilla van der Spuy

submitted in partial fulfilment

of the requirements for the degree

Magister Artium

in the

Department of Information Science

University of Pretoria

Supervisor: Prof Dr Johannes Cronjé

October 1999

Opsomming

‘n Virtuele veldhospitaal vir militêre verpleegkundiges

‘n Verhandeling deur

Marilla van der Spuy

Studieleier:	Prof Dr J. Cronjé
Departement:	Inligtingkunde
Graad:	Magister Artium

Die doel van die studie was om te bepaal hoe multimedia gebruik kan word vir die ontwikkeling van ‘n rekenaarprogram waardeur die ontplooiing van die veldhospitaal gesimuleer en inligting aan militêre verpleegkundiges oorgedra kan word. Die redes vir die ontwikkeling word aangevoer. Die daarstelling van so ‘n program benodig kennis van die beginsels vir die ontwerp, ontwikkeling en produksie van die program. ‘n Literatuurstudie is uitgevoer. Die fases in die ontwikkelingsproses van die program word beskryf. Besonderhede word verskaf oor die verkryging en evaluering van die resultate en die evalueringsproses word omskryf. Die bevindings word bespreek. Program spesifieke aanbevelings aangaande uitbreidings en verdere navorsing wat uitgevoer behoort te word, asook algemene aanbevelings vir die ontwikkeling van soortgelyke programme, word gedoen.

Sleutelwoorde: Virtuele veldhospitaal, militêre verpleegkundiges, multimedia program.

TABLE OF CONTENTS

A virtual field hospital for military nurses

CHAPTER 1 • FORMULATING THE RESEARCH PROBLEM

A thesis by

1.1 Introduction

Marilla van der Spuy

1.2 Background

1.3 The Expected new roles of the SANDF

Study leader: Prof Dr J. Cronjé
Theoretical gap in the preparation of the deployment of military nurses

Department:

Information Science

Degree:

Magister Artium

1.4 Statement of the problem

The aim of this study was to determine how multimedia could be used for the development of a computer program whereby the deployment of the field hospital can be simulated and information be made available to the military nurse. The reasons for the development of this program are explained. The creation of such a program needs in-depth knowledge of the principles for the design, development and production of the program. The phases of the development process of the program are discussed. Particulars regarding the acquisition and evaluation of the results and the evaluation process are described. The findings are presented. Program-specific recommendations regarding expansion and further research to be executed, as well as general recommendations for the development of similar programs, are made.

1.5 Summary of content

Key words: Virtual field hospital, military nurses, multimedia program.

1.6 4 Data collection methods

TABLE OF CONTENTS

1.1.1.1 Output	Page
1.1.1.1.1 Description of the problem	1
CHAPTER 1 : FORMULATING THE PROBLEM	
1.1 Introduction	1
1.1.1 Background	2
1.1.1.1 Expected new roles of the SANDF	2
1.1.1.2 Developed gap in the preparedness for involvement in military operations	2
1.1.1.3 Masters Degree in Military Nursing	3
1.1.2 Needs assessment	3
1.2 Research question	5
1.2.1 Research sub-questions	5
1.3 Value of this Research	6
1.4 Clarification of concepts	7
1.4.1 Field hospital	7
1.4.2 Main Medical Equipment	8
1.4.3 Deployment of Field Hospital	8
1.4.4 Military operations	8
1.4.5 Multimedia environment	8
1.5 Research Methodology	9
1.5.1 Research design and method	9
1.5.2 Population and sample	9
1.5.3 Data collection technique	9
1.5.4 Data collection methods	9
2.3.5 Constructing a web site	
2.3.5.1 Layout of a web site	

Page		
1.6	Output	12
1.6.1	Description of the product	12
1.6.2	Overview of research report	12
1.6.3	Limitations of research	13

CHAPTER 2 : LITERATURE REVIEW

2.1	Introduction	14
2.2	Presentation	14
2.2.1	Multimedia	14
2.2.2	Multimedia building blocks	16
2.2.2.1	Text	16
2.2.2.2	Text attributes	17
2.2.2.3	Screen design	24
2.2.2.4	Colour combinations	27
2.2.2.5	Images	28
2.2.2.6	Graphics and animation	29
2.2.2.7	“Drag-able” screen objects	32
2.2.3	How to create/keep attention	32
2.2.4	Simulation	33
2.3	Delivery systems	37
2.3.1	Computers	39
2.3.2	CD-ROM	40
2.3.2.1	Characteristics of CD-ROM	41
2.3.3	Hypertext Markup Language (HTML)	42
2.3.4	CD-ROM/WWW Hybrids	44
2.3.5	Constructing a web site	45
2.3.5.1	Layout of a web site	45

Page

2.3.6	Constraints and the future of training in the SA National Defence Force (SANDF)	47
-------	---	----

CHAPTER 3 : DESIGN, DEVELOPMENT AND PRODUCTION

3.1	Executive overview	50
3.2	Introduction	52
3.3	Stage 1: Analysis	52
3.3.1	Purpose	52
3.3.1.1	Goal analysis (performed in two phases)	53
3.3.1.2	Target population analysis	53
3.3.1.3	Content/information analysis	53
3.3.1.4	Media analysis	53
3.3.1.5	Project analysis	54
3.3.2	Limitations	54
3.3.2.1	Content/information of program	54
3.3.2.2	Inspection of deployed field hospital and interviews	55
3.4	Analysis method	55
3.4.1	Analysis methods	57
3.4.1.1	Interviews	57
3.4.1.2	Focus group (Phase 1)	57
3.4.1.3	Focus group (Phase 2)	58
3.4.1.4	Inspection	59
3.4.1.5	Questionnaires	59
3.4.1.6	Documentation review	60
3.4.1.7	Literature search	60
3.4.2	Delivery system	
3.4.3	Analysing the content	
3.4.4	Sequencing	

	Page
3.5 Sample	60
3.5.1 Interviews	60
3.5.2 Focus group (Phase 1)	61
3.5.3 Focus group (Phase 2)	62
3.6 Instrumentation	62
3.6.1 Questionnaires	62
3.6.1.1 Questionnaires to registered nurses	62
3.6.1.2 Interviews with registered nurses	63
3.7 Results	63
3.7.1 Goal analyses	63
3.7.2 Target population profile	64
3.7.2.1 Training and applicable courses needed	64
3.7.2.2 Educational and information needs	65
3.7.2.3 General knowledge regarding the field hospital	66
3.7.2.4 Computer literacy	67
3.7.2.5 Motivation	67
3.7.3 Content analysis	67
3.7.4 Media analysis	68
3.7.5 Project analysis	68
3.8 Triangulation	68
3.8.1 Data triangulation	68
3.9 Stage 2: The design of the program	69
3.9.1 Objectives	69
3.9.2 Delivery system	70
3.9.3 Analysing the content	70
3.9.4 Sequencing	71

	Page
3.9.5 Design specifications	71
3.10 Stage 3: Development of the program	74
3.10.1 Choice of editor for creating and managing web pages	74
3.10.2 Story boarding	75
3.10.3 Development of the prototype	75
3.10.4 Conduct formative evaluation and revise the program	75
3.10.4.1 Testing the program on the web	76
3.10.4.2 Potential users	76
3.10.4.3 Graphic design experts	76
3.11 Stage 4: Production	77
3.12 Stage 5: Summative evaluation of the program	77
3.13 Stage 6: Report	78
CHAPTER 4 : EVALUATION PROCEDURE	
4.1 Executive overview	79
4.2 Introduction	80
4.3 Target population and sample	80
4.4 Data collection process	81
4.4.1 Instruments used	81
4.4.1.1 User evaluation questionnaire	81
4.4.1.2 Interface rating form for experts	83
4.4.2 Collecting data	84
4.4.3 Analysing the data	84
4.4.3.1 Nurses deployed	84
4.4.3.2 Nurses never deployed	84

	Page
CHAPTER 5 : FINDINGS	115
5.1 Introduction	85
5.2 Evaluation of the programme	85
5.2.1 Target group (users)	85
5.2.1.1 Registered nurses	85
5.2.1.2 Personnel other than nurses	86
5.2.2 Expert evaluators	86
5.3 Findings	87
5.3.1 Design objective 1	87
5.3.1.1 Dimension of user interface: aesthetics	88
5.3.1.2 Dimension of user interface: design stability	90
5.3.1.3 Dimension of user interface: closure	92
5.3.1.4 Dimension of user interface: navigation	94
5.3.1.5 Dimension of user interface: mapping	96
5.3.1.6 Dimension of user interface: screen design	97
5.3.1.7 Dimension of user interface: simplicity and consistency	100
5.3.1.8 Dimension of user interface: metaphor or theme for the program	101
5.3.1.9 Dimension of user interface: media integration	101
5.3.2 Design objective 2	102
5.3.2.1 Dimension of user interface: information presentation	103
5.3.3 Design objective 3	105
5.3.3.1 Dimension of user interface: information presentation	105
5.3.4 Design objective 4	112
5.3.4.1 Dimension of user interface: ease of use	113
5.3.5 Overall functionality of the program	114
5.3.5.1 Nurses deployed	115
5.3.5.2 Nurses never deployed	115

	Page
5.3.5.3 Other military personnel	115
5.3.5.4 Experts	116
CHAPTER 6 : CONCLUSIONS AND RECOMMENDATIONS	
6.1 Introduction	118
6.2 Aspects that contributed to the success the program	118
6.2.1 Use multimedia to create and develop the program with the application of sound design specifications	119
6.2.1.1 Dimension of user interface: Aesthetics	119
6.2.1.2 Dimension of user interface: Design stability	120
6.2.1.3 Dimension of user interface: Closure	120
6.2.1.4 Dimension of user interface: Navigation	121
6.2.1.5 Dimension of user interface: Mapping	122
6.2.1.6 Dimension of user interface: Screen design	122
6.2.1.7 Dimension of user interface: Simplicity and consistency	123
6.2.1.8 Dimension of user interface: Metaphor or theme for the program	124
6.2.1.9 Dimension of user interface: Media integration	124
6.2.2 Simulate the deployment of the field hospital	125
6.2.2.1 Dimension of user interface: Information presentation (simulation)	125
6.2.3 Provide information to prepare the military nurse for functioning during military operations	126
6.2.3.1 Dimension of user interface: Information presentation	126
6.2.4 Create/keep attention	127
6.2.4.1 Dimension of user interface: Ease of use	128
6.3 Overall functionality of this program	128
6.4 Limitations of the research	129
6.4.1 Target group	129
6.4.2 Content/information of the program	129

	Page
6.5 Recommendations	130
6.5.1 Program specific recommendations	130
6.5.2 General recommendations for similar development	131
6.6 The way forward	135
References	137
Table 3.0 Definitions and types of dimension	13
Table 3.1 Advantages and disadvantages of implementing a program	13
Table 3.2 Strengths of the development process in the program	13
Table 3.3 Program's strengths and strengths of interface	13
Table 3.4 Major problems identified during the research	13
Table 3.5 Strengths of the application, training and support	13
Table 3.6 Quality of interface	13
Table 3.7 Overall user satisfaction	13
Table 4.0 Objectives to be met in the program for the questions about which to be answered	16
Table 5.1 Aspects of user interface dimension: aesthetics	51
Table 5.2 Expert interface rating: aesthetics (overall)	51
Table 5.3 Aspects of user interface dimension: ease of learning	51
Table 5.4 Expert interface rating: ease of learning	51
Table 5.5 Aspects of user interface dimension: design	51
Table 5.6 Expert interface rating: design	51
Table 5.7 Aspects of user interface dimension: navigation	51
Table 5.8 Expert interface rating: navigation	51
Table 5.9 Aspects of user interface dimension: mapping	51
Table 5.10 Expert interface rating: mapping	51
Table 5.11 Aspects of user interface dimension: screen design	51
Table 5.12 Expert interface rating: screen design	51
Table 5.13 Dimension of user interface: simplicity and consistency	52

List of tables	Page	
<i>Chapter 1: Introduction: research questions and methods</i>		
Expert interface rating: method integration		
Table 1.1	Research sub-questions	6
Table 1.2	Research questions and data collection methods	11
Table 2.1	Principles of screen design	25
Table 2.2	Categories and types of simulation	34
Table 2.3	Advantages and the convenience of simulations with examples	35
Table 3.1	Research questions	50
Table 3.2	Stages in the development process of the program	51
Table 3.3	Research questions and analysis methods	56
Table 3.4	Military courses completed by target group	65
Table 3.5	Nurses' needs for information, training and education	66
Table 3.6	Design objectives	70
Table 3.7	Design specifications	72
Table 4.1	Objectives to be met in the program for the main research question to be answered	82
Table 5.1	Aspects of user interface dimension: aesthetics	88
Table 5.2	Expert interface rating: aesthetics dimension	88
Table 5.3	Aspects of user interface dimension: design stability	90
Table 5.4	Expert interface rating: design stability	90
Table 5.5	Aspects of user interface dimension: closure	92
Table 5.6	Expert interface rating: closure	92
Table 5.7	Aspects of user interface dimension: navigation	94
Table 5.8	Expert interface rating: navigation	94
Table 5.9	Aspects of user interface dimension: mapping	95
Table 5.10	Expert interface rating: mapping	96
Table 5.11	Aspects of user interface dimension: screen design	98
Table 5.12	Expert interface rating: screen design	98
Table 5.13	Dimension of user interface: simplicity and consistency	99

List of appendices		Page
Table 5.14	Expert interface rating: metaphor or theme for the program	100
Table 5.15	Expert interface rating: media integration	101
Table 5.16	Aspects of user interface dimension: information presentation	103
Table 5.17	Aspects of user interface dimension: information presentation	106
Table 5.18	Expert interface rating: information presentation	107
Table 5.19	Recommendations regarding content to be included in the program	109
Table 5.20	Create/keep attention	112
Table 5.21	Expert interface rating: ease of use	113
Table 5.22	Expert interface rating: overall functionality	116
Table 6.1	Overview of recommendations	133

List of appendices

- Appendix A: Focus Group Protocol (Phase 1)
- Appendix B: Focus Group Protocol (Phase 2)
- Appendix C: Questionnaire for Target Population analysis
- Appendix D: Interview questionnaire for Target Population analysis
- Appendix E(1): Graphic representation: Goal analysis results: Phase 1
- Appendix E(2): Tabular representation: Goal analysis results: Phase 1
- Appendix F: Goal analysis results: Phase 2
- Appendix G: Project Plan
- Appendix H: Site map
- Appendix I: User evaluation questionnaire
- Appendix J: Expert interface rating form