



UNIVERSITI PUTRA MALAYSIA

**DEVELOPMENT OF BREAST HEALTH INFORMATION KIOSK IN
MALAYSIA**

SUHAILA SAMSURI

FPSK(M) 2007 16



**DEVELOPMENT OF BREAST HEALTH
INFORMATION KIOSK IN MALAYSIA**

SUHAILA SAMSURI

**MASTER OF SCIENCE
UNIVERSITI PUTRA MALAYSIA**

2007



**DEVELOPMENT OF BREAST HEALTH INFORMATION KIOSK IN
MALAYSIA**

By

SUHAILA SAMSURI

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia,
in Fulfilment of the Requirements for the Degree of Master of Science**

October 2007



To my family



Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Master of Science

**DEVELOPMENT OF BREAST HEALTH INFORMATION KIOSK IN
MALAYSIA**

By

SUHAILA BINTI SAMSURI

October 2007

Chairman: Associate Professor Rozi Mahmud, M.Sc.

Faculty: Medicine and Health Sciences

The Breast Health Information Kiosk is developed based on the principle issue that concerns breast health. Recent statistics showed that breast diseases have become a fatal cause to women. This kiosk is devised and designed carefully by taking into considerations of the end users' basic needs, in promoting enhancement of their knowledge in breast health. The developer and medical experts jointly combined ideas and efforts to disseminate profound and verified information, which is conveniently understandable by all quarters of people. Initially, a survey called 'User Needs Study' was conducted to ensure the design of the system satisfies the users' expectations. This was followed by a Pilot Test, which shows that the kiosk successfully achieved the acceptable usability criteria. This will determine the user's acceptance of kiosk. This kiosk is able to provide a platform to preserve, update and deliver the essential breast health information produced by local researchers for the Malaysian society. The main

focus of this kiosk is to assist in reducing breast cancer cases, which is alarming, subsequently improving the quality of health of Malaysian people generally.



Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

PEMBANGUNAN KIOSK INFORMASI KESIHATAN PAYUDARA DI MALAYSIA

Oleh

SUHAILA BINTI SAMSURI

Oktober 2007

Pengerusi: Profesor Madya Rozi Mahmud, M.Sc.

Fakulti: Perubatan dan Sains Kesihatan

Kesihatan payudara merupakan persoalan asas yang menjadi dasar bagi penghasilan Kiosk Informasi Kesihatan Payudara ini. Perangkaan terbaru menunjukkan penyakit berkaitan payudara menjadi faktor pembunuh di kalangan kaum wanita. Walaupun masih diperingkat prototaip, kiosk ini telah melalui proses penghasilan yang begitu teliti dan mengambil kira keperluan utama pengguna awam dalam usaha memperkayakan pengetahuan kesihatan mereka. Pembangun dan pakar perubatan bersama bergabung ide dan usaha dalam memastikan maklumat yang disampaikan mudah difahami oleh semua lapisan pengguna serta disahkan kesahihannya. Pada peringkat awal, kajiselidik atau 'Kajian Keperluan Pengguna' telah dijalankan bagi memastikan rekabentuknya memenuhi keselesaan pengguna. Ini diikuti pula oleh ujian Pilot terhadap prototaip kiosk bagi menentukan kelancaran perjalanan sistem kiosk dan hasilnya menunjukkan bahawa kiosk ini telah berjaya mencapai kriteria yang mampu memenuhi keperluan pengguna. Kajian ini dapat menyediakan satu platform yang mampu menyimpan, mengemaskini dan

menyalurkan sumber maklumat kesihatan payudara terpenting hasil kajian tempatan khusus untuk masyarakat Malaysia. Fokus utamanya adalah untuk membantu mengurangkan kadar kes barah payudara yang semakin membimbangkan setiap tahun, seterusnya membantu meningkatkan kualiti kesihatan penduduk di Malaysia.

ACKNOWLEDGEMENTS

While I have taken a few years to synthesize the ideas in this research, they would never have gotten between two covers without precious help from my supervisory's committee. The first to be acknowledged is my honourable chairman Associate Professor Dr. Rozi Mahmud at Faculty of Medical and Health Science who consistently monitors my research project and continuously gives me the invaluable guidance. I am indebted to her for helping me think through many of the basic ideas in the research. Associate Professor Dr. Suhaimi Napis, with whom I have had many discussions and who commented on the kiosk's task and functions. I am also indebted to Dr. Rosli Abdullah for his willingness to read and evaluate the entire thesis draft.

I must also acknowledge the lecturers in the Faculty of Computer Science and Information Technology for their precious knowledge, staffs of Institute of Multimedia and Softwares or Computer Interim Center for their help when I was in need. Thanks are due to Wijaya International Medical Center and Country Height Health Sanctuary for their cooperation to be the information and data sources for my Malaysian Breast Health Kiosk. I also owe a large debt to my family, especially my mom for her continuous support and endless belief toward my ability to complete this project. For his support and enduring, my special gratitude goes to my beloved husband for helping me in editing the entire thesis and contributing the ideas for content arrangement. My last word dedicated to everybody mentioned, I wish I could repay your kind deeds. May bless of Allah accompanying your life journey.



I certify that an Examination Committee has met on 8th October, 2007 to conduct the final examination of Suhaila binti Samsuri on her Master of Science thesis entitled “Development of Breast Health Information Kiosk in Malaysia” in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulations 1981. The committee recommends that the student be awarded the degree of Master of Science.

Members of the Examination Committee were as follows:

Mohammad Bakri Mustafa, MBBS, MMed Rad

Faculty of Medicine and Health Sciences
Universiti Putra Malaysia
(Chairman)

Sharifah Aishah Al Edrus, MBBS, MMed Rad

Faculty of Medicine and Health Sciences
Universiti Putra Malaysia
(Internal Examiner)

Abdul Rahman Ramli, PhD

Associate Professor
Faculty of Engineering
Universiti Putra Malaysia
(Internal Examiner)

Arsmah Ibrahim, PhD

Associate Professor
Faculty of Information Technology and Quantitative Sciences
Universiti Teknologi Mara
(External Examiner)

HASANAH MOHD GHAZALI, PhD

Professor and Deputy Dean
School of Graduate Studies
Universiti Putra Malaysia

Date: 29 January 2008



This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfillment of the requirement for the degree of Master of Science. The members of the Supervisory Committee were as follows:

Rozi Mahmud, M.Sc.

Associate Professor
Faculty of Medicine and Health Sciences
Universiti Putra Malaysia
(Chairman)

Suhaimi Napis, PhD

Associate Professor
Computer Interim Center
Universiti Putra Malaysia
(Member)

Rusli Abdullah, PhD

Lecturer
Faculty of Computer Science and Information Technology
Universiti Putra Malaysia
(Member)

AINI IDERIS, PhD

Professor and Dean
School of Graduate Studies
Universiti Putra Malaysia

Date: 21 February 2008



DECLARATION

I hereby declare that the thesis is based on my original work except for quotations and citations, which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UPM or other institutions.

SUHAILA BINTI SAMSURI

Date:



TABLE OF CONTENTS

		Page
DEDICATION		ii
ABSTRACT		iii
ABSTRAK		v
ACKNOWLEDGEMENTS		vii
APPROVAL		viii
DECLARATION		x
LIST OF TABLES		xiv
LIST OF FIGURES		xvi
LIST OF ABBREVIATIONS		xxii
CHAPTER		
1	INTRODUCTION	
	1.1 Introduction	1
	1.2 Research Background	3
	1.3 Problem Statement	6
	1.4 Problem Scope	7
	1.5 Objectives of Project	9
2	LITERATURE REVIEW	
	2.1 Introduction	11
	2.2 Important Facts on Human Breast Anatomy	11
	2.3 The Significance of Choosing Breast As A Topic of Concern	14
	2.4 Malaysia's Effort in Supporting the Breast Health and Fighting Breast Disease	15
	2.5 Kiosk As A Tool of Information	24
	2.5.1 Kiosk Definition	26
	2.5.2 Internet Impact on Kiosk	28
	2.5.3 Classification of a Kiosk System	29
	2.5.4 Kiosk Component	39
	2.5.5 Design of Kiosk As A Medium of Information for People	42
	2.5.6 Concepts of User Interface Design	43
	2.5.7 Kiosk Requirements	49
	2.6 Information Technology In Medical Information (Malaysian Scenario)	51
	2.7 Kiosk Advantages and Disadvantages	53
3	RESEARCH METHODOLOGY	
	3.1 Introduction	55
	3.2 Data Collection	55



	3.2.1 User Needs Study Design	55
	3.2.2 Medical Professional Information	57
	3.3 Authoring Environment	58
	3.4 Pilot Test	61
	3.5 Analysis	63
4	DEVELOPMENT OF PROTOTYPE	
	4.1 Introduction	64
	4.2 Philosophy and Approach	65
	4.3 Implementation of User Needs Study	65
	4.4 Collecting Medical Professional Information Sources	66
	4.4.1 Evaluation System Metrics of Breast Diseases	75
	4.5 Kiosk Development	77
	4.6 Conceptual Development	79
	4.6.1 Survey (Online Questionnaire) Design	81
	4.6.2 Target User	85
	4.6.3 Description of Proposed Kiosk	85
	4.7 Kiosk Physical	94
	4.7.1 Hardware	94
	4.7.2 Software	95
	4.7.3 Administration Program	101
	4.7.4 Deploying Kiosk System	103
	4.7.5 Security and the Internet	104
	4.7.6 Map Out Navigation	104
	4.7.7 Storyboard of the Kiosk Interface	109
	4.8 Pilot Test Implementation	123
	4.8.1 User Acceptance Test	124
	4.8.2 User Selection	125
	4.8.2.1 Inclusion Criteria	125
	4.8.2.2 Exclusion Criteria	126
	4.8.3 Evaluation Approach	127
	4.9 Iterative Development Process	128
5	RESULT & DISCUSSION	
	5.1 User Needs Study	130
	5.1.1 Summary of User Needs Study Result	144
	5.2 Prototyping	146
	5.3 Pilot Test	173
	5.3.1 Mean of Overall User Acceptance	180
	5.3.2 Mean Difference Based on User's Computer Experience	180
	5.3.3 Mean Difference Based on User's Group of Age	181
	5.3.4 Summary of Pilot Test Findings	182
6	CONCLUSIONS	



6.1 Research Conclusions	184
6.2 Limitations of the Project	188
6.3 Future Research Suggestion	189
BIBLIOGRAPHY	190
APPENDICES	194
BIODATA OF THE AUTHOR	212

LIST OF TABLES

Table		Page
4.1	Table of BIRADS Scores	76
5.1	Pilot Survey Findings	175
5.2	Mean of Overall User Acceptance	180
C1	User Needs Survey Based on Gender	202
C2	User Needs Survey Based on Age Group	202
C3	User Needs Survey Based on Ethnic	202
C4	User Needs Survey Based on Occupation	202
C5	Frequency of People Using Computer	203
C6	Purpose of People Using Computer	203
C7	Common Location of Internet Access	203
C8	Internet Usage In People's Daily Life	203
C9	Reliability of Internet Information As References	203
C10	Number of People Knowledgeable About Breast Cancer	204
C11	People's Common Method in Obtaining Health Information	204
C12	Information Resource about Breast Cancer	204
C13	Best Way to Deliver Information	204
C14	Language Preference for Information Source	204
C15	Easiest Way to Gain Information on Health	205
C16	Presentation Preference to Encourage Interest on Health Subject	205
C17	Method Preference in Seeking Information about Breast Health	205
C18	Preferred Method in Finding Information	205

C19	Common Subject of Information Regarding Breast Health	205
D1	Frequency of Acceptance for Each Question	206
E1	Mean of Overall Questions	209
F1	Mean of Overall Questions based on User's Computer Experience	210
G1	Mean of Overall Questions based on User's Group of Age	211



LIST OF FIGURES

Figure	Page
2.1 A Kiosk Anatomy	28
2.2 Canada Tourism's Information Kiosk	31
2.3 Webster Plastic's Product Promotion Kiosk	33
2.4 Maybank2u.com Service or Transaction	35
2.5 Little Tikes Shopping Kiosk Product-Dispensing Kiosk	37
2.6 MPH Bookstore Internet Commerce Kiosk	39
2.7 Example of Icon that Uses the Concept of Metaphor	45
2.8 Example of Icon for Recycle Bin	45
2.9 Dialogue Box as an Example of Forgiveness Concept	48
4.1 Breast Health Information Kiosk Development Process	77
4.2 Process of System Development	80
4.3 Login Interface to Access the Interactive Breast Assessment	88
4.4 Georgia with 12 Point	90
4.5 Explanation Information Picture	91
4.6 Main Menu for Malaysian Breast Health Kiosk Which Contains Menus' Descriptions	93
4.7 Macromedia Authorware 7.01 Workspace	95
4.8 Splash Screen of Breast Health Information Kiosk	96
4.9 Breast Health Information Banner	96
4.10 Breast Health Information Kiosk Logo	97
4.11 Breast Health Information Kiosk Animated Flowchart	97

4.12	Screening & Diagnostic Level Assessment Background (Still Image)	98
4.13	Screening & Diagnostic Level Assessment Animated Title	98
4.14	Home Icon	98
4.15	Homepage background	99
4.16	Example of Buttons Used in the Kiosk	99
4.17	Example of Icons Used in the Kiosk	99
4.18	Breast Health Library Background	100
4.19	Living with Cancer Background	100
4.20	Users Database to Store Interactive Breast Assessment Results and Details	102
4.21	The Navigation Flow Diagram For Breast Health Information Kiosk	108
4.22	Storyboard For Breast Health Information Kiosk Main Menu Page	110
4.23	Storyboard For Breast Health Library Menu	111
4.24	Storyboard For Breast Health Library Information Page	112
4.25	Storyboard For Kiosk ‘Living With Cancer’ Menu	113
4.26	Storyboard For Kiosk ‘Living With Cancer’ Page	113
4.27	Storyboard For Kiosk Interactive Breast Assessment Login Page	114
4.28	Storyboard for Kiosk ‘Interactive Breast Assessment’: Risk Estimation Level Page	115
4.29	Storyboard for Kiosk ‘Interactive Breast Assessment’: Risk Estimation Level Page	116
4.30	Storyboard For Kiosk ‘Interactive Breast Assessment’: Symptom And Anatomy Level Page	117
4.31	Storyboard For Kiosk ‘Interactive Breast Assessment’: Screening and Diagnosis Level Menu	118

4.32	Storyboard For Kiosk ' <i>Interactive Breast Assessment</i> ': Screening and Diagnosis Level Page	118
4.33	Storyboard For Kiosk ' <i>Interactive Breast Assessment</i> ': Result Page	119
4.34	Storyboard For Kiosk ' <i>NEWS</i> ' Page	120
4.35	Storyboard For Kiosk ' <i>Ask The Doctor</i> ' Page	121
4.36	Storyboard for Kiosk ' <i>Survey</i> ' Page	121
4.37	Storyboard for Kiosk ' <i>Administration</i> ' Page	122
4.38	The Breast Health Information Kiosk's First Interface	129
5.1	User Needs Study Respondents	130
5.2	User Needs Study Based on Age Group	131
5.3	User Needs Study Based on Ethnic	131
5.4	User Needs Survey Based on Occupation	132
5.5	Frequency of People Using Computer	133
5.6	Purpose of People Using Computer	134
5.7	Common Location of Internet Access	135
5.8	Internet Usage Has Become Significant In People's Daily Life	136
5.9	Reliability of Internet Information as References	136
5.10	Number Of People Knowledgeable About Breast Cancer	137
5.11	People's Common Method in Obtaining Health Information	138
5.12	Information Resources About Breast Cancer In Malaysia	139
5.13	Best Way to Deliver The Information	140
5.14	Language Preference For Information Source	140
5.15	Easiest Way to Gain Information on Health	141

5.16	Presentation Preference To Encourage People's Interest On Health Subject	142
5.17	Method Preference in Seeking Information about Breast Health	142
5.18	Preferred Method in Finding Information	143
5.19	Common Subject Regarding Breast Health	144
5.20	Splash Screen	147
5.21	Breast Health Information Kiosk Homepage	148
5.22	Breast Health Information Kiosk Main Menu	149
5.23	Breast Health Library menu	150
5.24	Breast Health Library Subtopic Menu	151
5.25	Breast Health Library Information Page	151
5.26	Living with Cancer Menu	152
5.27	Living With Cancer Information Page	153
5.28	Living With Cancer Hyperlink Page	154
5.29	Interactive Breast Assessment Login Page	155
5.30	Interactive Breast Assessment for Risk Estimation Page	155
5.31	Interactive Breast Assessment For Risk Estimation 'Result' Page	156
5.32	Interactive Breast Assessment For Risk Estimation 'Result Explanation' Page	157
5.33	Interactive Breast Assessment For Symptom And Anatomy Level Menu	158
5.34	Interactive Breast Assessment For Symptom And Anatomy Level Page	159
5.35	Interactive Breast Assessment For Symptom And Anatomy Level 'Result' Page	159

5.36	Interactive Breast Assessment For Screening & Diagnosis Level Menu	160
5.37	Interactive Breast Assessment for Screening & Diagnosis Level Page	161
5.38	Interactive Breast Assessment for Screening & Diagnosis Level 'Benign' Page	162
5.39	Interactive Breast Assessment for Screening & Diagnosis Level 'Benign Treatment' Page	162
5.40	Interactive Breast Assessment for Screening & Diagnosis Level 'Malignant' Page	163
5.41	Interactive Breast Assessment for Screening & Diagnosis Level 'Malignant Treatment' Page	164
5.42	News Page	164
5.43	Ask the Doctor Page	165
5.44	Ask the Doctor: E-mail Page	166
5.45	Ask the Doctor: Forum Box	166
5.46	Survey Login Page	167
5.47	Survey Page	168
5.48	Administration Page	168
5.49	Administrator's Page	169
5.50	Profile of the Medical Professional and Developer	170
5.51	Login By Key In The Password Page	170
5.52	Update User Records And News Archive Page	171
5.53	User Information Page	172
5.54	Breast Health News Updating Page	172
5.55	Breast Health Kiosk Reference Page	173



5.56	Mean Value For Overall Questions Based On User's Computer Experience	181
5.57	Mean Value For Overall Questions Based On User's Computer Experience	181
B1	Survey Login Interface	197
B2	Survey Page 2	198
B3	Survey Page 3	199
B4	Survey Page 4	200
B5	Survey Page 5	201

LIST OF ABBREVIATIONS

BCWA	Breast Cancer Welfare Association
GUI	Graphical User Interface
HCI	Human-Computer Interaction
HTML	Hypertext Mark-up Language
ICT	Information Communication Technology
LAN	Local Area Network
MAKNA	Majlis Kanser Nasional
MBCC	Malaysian Breast Cancer Council
MDAC	Microsoft Data Access Component
MSC	Multimedia Super Corridor
NCWO	National Council of Women's Organizations
NGO	Non-Government Organization
ODBC	Open Database Connectivity
OS	Operating System
PET	Positron Emission Tomography
R&D	Research and Development
SPSS	Statistical Package for Social Science
SQL	Structured Query Language
WWW	World Wide Web

CHAPTER 1

INTRODUCTION

1.1 Introduction

“Development of Breast Health Information Kiosks in Malaysia” is one of the efforts taken to disseminate complete information on health to the society, especially to Malaysians who lack the consciousness about managing and leading a healthy life style. The integration of the technologies, computer applications and health science make it easier for people to have unlimited access on the essential information whenever or wherever they require. Alternatively, we no longer depend only on the traditional face-to-face expensive consultation sessions to give us what we need. Like it or not, multimedia applications and technology enhancements are set to take over human role in serving human needs. The principle of ‘human computer interaction’ has been the key element for every development of this multimedia application.

It is a known fact that breast cancer is the most common form of cancer, and the most regular cause of cancer death, particularly among Malaysian women. The cancer registry in its latest report in 2003 recently released by the Malaysian Ministry of Health indicates that breast cancer cases are significantly increasing, one in 28 Malays, one in 16 Chinese and one in 16 Indian women may develop breast cancer [1]. Based on the gravity of the impact, this topic is chosen in order to help Malaysian women especially in gaining sufficient information on the importance of prevention and the right way of getting the treatment.

