

University of Wollongong - Research Online

Thesis Collection

Title: Online health services: study of user perceptions of the perceived usefulness of an evolving web-based health community using Q-methodology and activity theory

Author: Ngo Lui M Mok

Year: 2008

Repository DOI:

Copyright Warning

You may print or download ONE copy of this document for the purpose of your own research or study. The University does not authorise you to copy, communicate or otherwise make available electronically to any other person any copyright material contained on this site.

You are reminded of the following: This work is copyright. Apart from any use permitted under the Copyright Act 1968, no part of this work may be reproduced by any process, nor may any other exclusive right be exercised, without the permission of the author. Copyright owners are entitled to take legal action against persons who infringe their copyright. A reproduction of material that is protected by copyright may be a copyright infringement. A court may impose penalties and award damages in relation to offences and infringements relating to copyright material.

Higher penalties may apply, and higher damages may be awarded, for offences and infringements involving the conversion of material into digital or electronic form.

Unless otherwise indicated, the views expressed in this thesis are those of the author and do not necessarily represent the views of the University of Wollongong.

Research Online is the open access repository for the University of Wollongong. For further information contact the UOW Library: research-pubs@uow.edu.au

2008

Online health services: study of user perceptions of the perceived usefulness of an evolving web-based health community using Q-methodology and activity theory

Ngo Lui M. Mok

University of Wollongong

Follow this and additional works at: <https://ro.uow.edu.au/theses>

University of Wollongong

Copyright Warning

You may print or download ONE copy of this document for the purpose of your own research or study. The University does not authorise you to copy, communicate or otherwise make available electronically to any other person any copyright material contained on this site.

You are reminded of the following: This work is copyright. Apart from any use permitted under the Copyright Act 1968, no part of this work may be reproduced by any process, nor may any other exclusive right be exercised, without the permission of the author. Copyright owners are entitled to take legal action against persons who infringe their copyright. A reproduction of material that is protected by copyright may be a copyright infringement. A court may impose penalties and award damages in relation to offences and infringements relating to copyright material.

Higher penalties may apply, and higher damages may be awarded, for offences and infringements involving the conversion of material into digital or electronic form.

Unless otherwise indicated, the views expressed in this thesis are those of the author and do not necessarily represent the views of the University of Wollongong.

Recommended Citation

Mok, Ngo LM, Online health services: study of user perceptions of the perceived usefulness of an evolving web-based health community using Q-methodology and activity theory, MIS-Res thesis, School of Management and Marketing, University of Wollongong, 2008. <http://ro.uow.edu.au/theses/108>

NOTE

This online version of the thesis may have different page formatting and pagination from the paper copy held in the University of Wollongong Library.

UNIVERSITY OF WOLLONGONG

COPYRIGHT WARNING

You may print or download ONE copy of this document for the purpose of your own research or study. The University does not authorise you to copy, communicate or otherwise make available electronically to any other person any copyright material contained on this site. You are reminded of the following:

Copyright owners are entitled to take legal action against persons who infringe their copyright. A reproduction of material that is protected by copyright may be a copyright infringement. A court may impose penalties and award damages in relation to offences and infringements relating to copyright material. Higher penalties may apply, and higher damages may be awarded, for offences and infringements involving the conversion of material into digital or electronic form.

Online Health Services: Study of user perceptions of the perceived usefulness of an evolving Web- based Health Community using Q-methodology and Activity Theory

A thesis submitted in fulfilment of the requirements
for the award of the degree

MASTER OF INFORMATION SYSTEMS (RESEARCH)

FROM

UNIVERSITY OF WOLLONGONG



By

Ngo Lui Michelle Mok, BCom (BIS), MIS, MBA

School of Management and Marketing

Faculty of Commerce

2008

THESIS CERTIFICATE

CERTIFICATION

I, Ngo Lui Michelle Mok, declare that this thesis, submitted in fulfilment of the requirements for the award of Master of Information Systems (Research), in the School of Management and Marketing, Faculty of Commerce, University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. This document has not been submitted for qualifications at any other academic institution.

Ngo Lui Michelle Mok

28th August, 2008

TABLE OF CONTENTS

THESIS CERTIFICATE.....	2
TABLE OF CONTENTS	3
LIST OF FIGURES	6
LIST OF TABLES.....	7
LIST OF ABBREVIATIONS	10
ABSTRACT 11	
ACKNOWLEDGEMENT	12
OVERVIEW OF THE THESIS CHAPTERS.....	13
CHAPTER 1: INTRODUCTION OF THIS RESEARCH	15
1.1 INTRODUCTION	15
1.2 BACKGROUND OF THIS RESEARCH	17
1.3 BACKGROUND OF RESEARCH AREA: WEB-BASED INFORMATION SYSTEMS	19
1.4 SIGNIFICANCE OF THE RESEARCH	20
1.5 PURPOSE AND OBJECTIVES OF THE RESEARCH.....	21
1.6 METHODOLOGY OF THIS RESEARCH.....	23
1.6.1 <i>Q-methodology</i>	23
1.6.2 <i>Activity Theory</i>	24
1.7 OUTCOME OF THE RESEARCH	26
CHAPTER 2: WEB-BASED INFORMATION SYSTEMS AND THE APPROACHES ADOPTED IN THIS STUDY 27	
2.1 INTRODUCTION	27
2.2 WEB-BASED INFORMATION SYSTEMS	30
2.3 STRUGGLES OF INFORMATION SYSTEMS	34
2.4 USER INFORMED DESIGN	36
2.5 APPROACH TO THE USER INFORMED DESIGN.....	39
2.6 USABILITY GUIDELINES	41
CHAPTER 3: AUSTRALIAN HEALTH CARE WEB-BASED SERVICES	45
3.1 INTRODUCTION	45
3.2 AUSTRALIAN HEALTH CARE WBIS DEVELOPMENT	47
3.3 INTENSIVE CARE UNITS IN NSW	52
3.4 EVIDENCE-BASED PRACTICE	56
CHAPTER 4: REVIEW OF THE LITERATURE - ACTIVITY THEORY	59
4.1 INTRODUCTION	59
4.2 THE COMPONENTS OF ACTIVITY THEORY.....	61
4.2.1 <i>Activity</i>	61
4.2.2 <i>Action</i>	62
4.2.3 <i>Operation</i>	63
4.3 THE PRINCIPLES OF ACTIVITY THEORY	65
4.3.1 <i>Object Orientedness</i>	65
4.3.2 <i>Internalization and Externalization</i>	66
4.3.3 <i>Tool Mediation</i>	67
4.3.4 <i>Hierarchical Structure of Activity</i>	69
4.3.5 <i>Continuous Development</i>	71
4.3.6 <i>Activity Theory can be the development of Information Systems</i>	71

4.4	ENGESTRÖM'S GENERATION ON ACTIVITY THEORY	73
4.5	CULTURAL HISTORICAL PSYCHOLOGY IN ACTIVITY THEORY	76
CHAPTER 5: METHODOLOGY - Q-METHODOLOGY		81
5.1	INTRODUCTION	81
5.2	Q-METHODOLOGY'S BACKGROUND	83
5.3	Q-METHODOLOGY TO CREATE A SHARED UNDERSTANDING	86
5.4	Q-METHODOLOGY AS USED IN THIS STUDY	90
CHAPTER 6: REVIEW AND ANALYSIS OF THE EXISTING WBIS		91
6.1	INTRODUCTION	91
6.2	GOAL	93
6.2.1	<i>User-Informed Design</i>	95
6.3	SCOPE	97
6.4	ANALYSIS OF THE CURRENT WEB-BASED INFORMATION SYSTEMS STRUCTURE	98
6.4.1	<i>Analysis of the Current WBIS Structure and its Design</i>	100
6.4.2	<i>Analysis of the General Public (Visitor) Information</i>	101
6.4.3	<i>Analysis of Clinician Information</i>	102
6.4.4	<i>Analysis of the Current WBIS General Collation</i>	102
6.5	REVIEW OF THE CRITERIA OF CURRENT WBIS	103
6.5.1	<i>Functionality</i>	103
6.5.2	<i>Content</i>	105
6.5.3	<i>Design</i>	107
6.5.4	<i>Security</i>	109
6.5.5	<i>Output</i>	109
6.6	PROBLEMS IDENTIFIED FOR THE CURRENT WBIS	111
6.6.1	<i>'Protected Area' does not indicate how people can get access</i>	111
6.6.2	<i>Some functions do not work</i>	112
6.6.3	<i>Confusing user interface</i>	112
6.6.4	<i>Research field is not complete, no indication is going to be completed</i>	113
6.6.5	<i>Inconvenient to use search function</i>	113
6.6.6	<i>Lack of discussion service and interactive communication platform</i>	113
6.6.7	<i>Multicultural Translation/Communication problem</i>	114
6.6.8	<i>Missing Help Page</i>	115
CHAPTER 7: RESEARCH METHODOLOGY IN SERVICES, DESIGN, FUNCTION AND OUTPUT VIEW		116
7.1	INTRODUCTION	116
7.2	RESEARCH METHOD	118
7.3	PART A: WBIS RESEARCH IN SERVICES VIEW	119
7.3.1	<i>Factor 1: Clinician Resource Focus</i>	122
7.3.2	<i>Factor 2: Communication Focus</i>	126
7.3.3	<i>Factor 3: Educational Focus</i>	128
7.3.4	<i>Factor 4: Community Based Information View with Rural Focus</i>	130
7.3.5	<i>Factor 5: Evidence Based Practice, Service and Communication Focus</i>	132
7.4	PART B: WBIS RESEARCH IN FUNCTION VIEW	134
7.4.1	<i>Factor 1: Developer Focus</i>	137
7.4.2	<i>Factor 2: End-user Focus</i>	139
7.5	PART C: WBIS RESEARCH IN DESIGN VIEW	142
7.5.1	<i>Factor 1: Responsive Focus</i>	144
7.5.2	<i>Factor 2: End-user Focus</i>	146
7.5.3	<i>Factor 3: Advance User Focus</i>	148
7.5.4	<i>Factor 4: User Friendly Focus</i>	150
7.5.5	<i>Factor 5: Specific Focus</i>	152
7.6	PART D: WBIS RESEARCH IN OUTPUT VIEW	154
7.6.1	<i>Factor 1: Quality Focus</i>	156
7.6.2	<i>Factor 2: Education Focus</i>	158

7.6.3	<i>Factor 3: Patients and their Relatives' Focus</i>	160
7.6.4	<i>Factor 4: Information Focus</i>	162
CHAPTER 8: REVIEW AND REPORT OF THE RESEARCH RESULTS		164
8.1	OVERVIEW OF THE CHAPTERS	164
8.2	OVERVIEW OF THE RESEARCH	169
8.3	OVERVIEW OF THE FACTORS	171
8.4	REVIEW OF THE SERVICES VIEWS	172
8.4.1	<i>Factor 1 in Services View – Clinician Resource Focus</i>	172
8.4.2	<i>Factor 2 in Services View – Communication Focus</i>	173
8.4.3	<i>Factor 3 in Services View – Education Focus</i>	175
8.4.4	<i>Factor 4 in Services View – Community Based Information View with Rural Focus</i>	176
8.4.5	<i>Factor 5 in Services View – Evidence Based Practice, Service and Communication Focus</i>	177
8.4.6	<i>Cross Factor comparisons</i>	178
8.5	REVIEW OF THE FUNCTION VIEWS	180
8.5.1	<i>Factor 1 in Function View – Developer Focus</i>	180
8.5.2	<i>Factor 2 in Function View – End-user Focus</i>	181
8.5.3	<i>Cross Factor comparisons</i>	182
8.6	REVIEW OF THE DESIGN VIEWS	184
8.6.1	<i>Factor 1 in Design View – Responsive Focus</i>	184
8.6.2	<i>Factor 2 in Design View – End-user Focus</i>	185
8.6.3	<i>Factor 3 in Design View – Advanced User Focus</i>	186
8.6.4	<i>Factor 4 in Design View – User Friendly Focus</i>	187
8.6.5	<i>Factor 5 in Design View – Specific Focus</i>	188
8.6.6	<i>Cross Factor comparisons</i>	189
8.7	REVIEW OF THE OUTPUT VIEWS.....	191
8.7.1	<i>Factor 1 in Output View – Quality Focus</i>	191
8.7.2	<i>Factor 2 in Output View – Education Focus</i>	192
8.7.3	<i>Factor 3 in Output View – Patients and their relatives' Focus</i>	193
8.7.4	<i>Factor 4 in Output View – Information Focus</i>	194
8.7.5	<i>Cross Factor comparisons</i>	195
8.8	DISCUSSION IN FOUR DIFFERENCE VIEWS	199
8.9	INITIAL RECOMMENDATION OF WBIS DESIGN IMPROVEMENTS	201
CHAPTER 9: EVALUATION AND IMPLICATION FOR FURTHER STUDY		202
9.1	INTRODUCTION	202
9.2	REVIEW AND EVALUATION	203
9.3	THE SIGNIFICANCE OF THIS STUDY IN REVIEW	205
9.4	RECOMMENDATIONS - THE OPPORTUNITIES FOR FURTHER STUDY	208
CHAPTER 10: BIBLIOGRAPHY		209
APPENDIX A: 47 STATEMENTS IN SERVICES VIEW		221
APPENDIX B: 45 STATEMENTS IN FUNCTION VIEW		222
APPENDIX C: 26 STATEMENTS IN DESIGN VIEW.....		223
APPENDIX D: 25 STATEMENTS IN OUTPUT VIEW		224

LIST OF FIGURES

Figure 2.1	Human Activity System (Engeström 1999)
Figure 4.1	Leontiev's model of Activity Levels (Verenikina 1998)
Figure 4.2	The Hierarchical Structure of Activity (Hasan, 1998)
Figure 4.3	The structure of a Human Activity System (Engeström 1999)
Figure 4.4	The structure of a Human Activity System (Engeström 1999)
Figure 5.1	Q-Sort triangles for ranking of the statements
Figure 6.1	Structures of Web-based Services in 2006
Figure 6.2	The main page interface of Web-based Information Systems in 2006
Figure 6.3	The main Customer interface pages in 2006
Figure 6.4	The main Clinician interface pages in 2006
Figure 8.1	Activity Theory Triangle applied on Services View
Figure 8.2	Activity Theory Triangle applied on Function View
Figure 8.3	Activity Theory Triangle applied on Design View
Figure 8.4	Activity Theory Triangle applied on Output View
Figure 9.1	A holistic model of human activity (Engeström)

LIST OF TABLES

Table 7.1	Q Sort Distribution in Services View
Table 7.2	Distributed in Sort in Services View
Table 7.3	Factor 3 to Factor 5's Solution in Services View
Table 7.4	Correlation between Factors in Services View
Table 7.5	Factor 1 - Strongly Agree in Services View
Table 7.6	Factor 1 - Strongly Disagree in Services View
Table 7.7	Factor 1 - 2 Statements that Distinguish Factor 1 from the other Factors
Table 7.8	Factor 2 - Strongly Agree in Services View
Table 7.9	Factor 2 - Strongly Disagree in Services View
Table 7.10	Factor 2 - 1 item Distinguished from all other Factors
Table 7.11	Factor 3 - 1 item Distinguished from all other Factors
Table 7.12	Factor 3 - Strongly Agree in Services View
Table 7.13	Factor 3 – Strongly Disagree in Services View
Table 7.14	Factor 4 - Strongly Agree in Services View
Table 7.15	Factor 4 - Strongly Disagree in Services View
Table 7.16	Factor 4 – 3 items Distinguished from all other Factors
Table 7.17	Factor 5 - Strongly Agree in Services View
Table 7.18	Factor 5 - Strongly Disagree in Services View
Table 7.19	Q Sort Distribution in Function View
Table 7.20	Distribution in Sort in Function View
Table 7.21	Correlation between Factors in Function View
Table 7.22	Factor 2 to Factor 5's Solution in Function View
Table 7.23	Consensus Statements in Function View
Table 7.24	Factor 1 - Strongly Agree in Function View
Table 7.25	Factor 1 - Strongly Disagree in Function View
Table 7.26	Factor 2 - Strongly Agree in Function View
Table 7.27	Factor 2 - Strongly Disagree in Function View
Table 7.28	Factors 1 & 2 - 18 items Distinguished from all other Factors
Table 7.29	Q Sort Distribution in Design View
Table 7.30	Distributed in Sort in Design View
Table 7.31	Factor 3 to Factor 5's Solution in Design View
Table 7.32	Correlation between Factors in Design View

Table 7.33	Factor 1 - Strongly Agree in Design View
Table 7.34	Factor 1 - Strongly Disagree in Design View
Table 7.35	Factor 2 - Strongly Agree in Design View
Table 7.36	Factor 2 - Strongly Disagree in Design View
Table 7.37	Factor 3 - Strongly Agree in Design View
Table 7.38	Factor 3 - Strongly Disagree in Design View
Table 7.39	Factor 4 - Strongly Agree in Design View
Table 7.40	Factor 4 - Strongly Disagree in Design View
Table 7.41	Factor 5 - Strongly Agree in Design View
Table 7.42	Factor 5 - Strongly Disagree in Design View
Table 7.43	Q Sort Distribution in Output view
Table 7.44	Distributed in Sort in Output View
Table 7.45	Factor 2 to Factor 5's Solution in Output view
Table 7.46	Correlation between Factors in Output view
Table 7.47	Consensus Statements in Output view
Table 7.48	Factor 1 - Strongly Agree in Output view
Table 7.49	Factor 1 - Strongly Disagree in Output view
Table 7.50	Factor 2 - Strongly Agree in Output view
Table 7.51	Factor 2 - Strongly Disagree in Output view
Table 7.52	Factor 3 - Strongly Agree in Output view
Table 7.53	Factor 3 - Strongly Disagree in Output view
Table 7.54	Factor 4 - Strongly Agree in Output view
Table 7.55	Factor 4 - Strongly Disagree in Output view
Table 7.56	Factor 4 - 3 items Distinguished from all other Factors
Table 8.1	Overview of the 4 different Terms/Areas
Table 8.2	Overview for the Services Views
Table 8.3	Significantly different strongly Agreeing & Disagreeing Statements in Factor 1, Services View – Clinician Resource Focus
Table 8.4	Significantly different strongly Agreeing & Disagreeing Statements in Factor 2, Services View – Communication Focus
Table 8.5	Significantly different strongly Agreeing & Disagreeing Statements in Factor 3, Services View – Education Focus
Table 8.6	Significantly different strongly Agreeing & Disagreeing Statements in Factor 4, Services View – Community Based Information View with Rural Focus
Table 8.7	Significantly different strongly Agreeing & Disagreeing Statements in Factor 5,

Services View – Evidence Based Practice, Services & Communication Focus

Table 8.8	Sort in Services View
Table 8.9	Overview for the Function View
Table 8.10	Significantly different strongly Agreeing & Disagreeing Statements in Factor 1, Function View – Developer Focus
Table 8.11	Significantly different strongly Agreeing & Disagreeing Statements in Factor 2, Function View – End-user Focus
Table 8.12	Distributed the Sort in Function View
Table 8.13	Overview for the Design View
Table 8.14	Significantly different strongly Agreeing & Disagreeing Statements in Factor 1, Design View – Responsive Focus
Table 8.15	Significantly different strongly Agreeing & Disagreeing Statements in Factor 2, Design View – End-user Focus
Table 8.16	Significantly different strongly Agreeing & Disagreeing Statements in Factor 3, Design View – Advanced User Focus
Table 8.17	Significantly different strongly Agreeing & Disagreeing Statements in Factor 4, Design View – User Friendly Focus
Table 8.18	Significantly different strongly Agreeing & Disagreeing Statements in Factor 5, Design View – Specific Focus
Table 8.19	Distributed the Sort in Design View
Table 8.20	Overview for the Output View
Table 8.21	Significantly different strongly Agreeing & Disagreeing Statements in Factor 1, Output View – Quality Focus
Table 8.22	Significantly different strongly Agreeing & Disagreeing Statements in Factor 2, Output View – Education Focus
Table 8.23	Significantly different strongly Agreeing & Disagreeing Statements in Factor 3, Output View – Patients and their Relatives Focus
Table 8.24	Significantly different strongly Agreeing & Disagreeing Statements in Factor 4, Output View – Information Focus
Table 8.25	Distributed the Sort in Output View

LIST OF ABBREVIATIONS

DT	Development Team
ICU	Intensive Care Unit
ICCMU	Intensive Care Coordination & Monitoring Unit
NSW	New South Wales
WBIS	Web-based Information Systems
WWW	World Wide Web

ABSTRACT

The main question asked in this study is what are the perceived information needs of clinical professionals working in Intensive Care Units (ICUs) that can usefully be accommodated with a Web-based Information Service? The study seeks to examine the perceptions of the service provision over a period of time during which the Web-based Information Systems (WBIS) was introduced.

This study aims to compare the views of two key groups of individuals that is the Professional end-users in ICUs as well as the WBIS Development Team in regards to the perceived usefulness of a Health Information Service over a 9 month period.

This thesis then is seeking to identify the efficient solutions using the Q-methodology and Activity Theory to improve the WBIS and communication within and among ICUs and to provide easy access for users.

The approach taken here is to obtain guidance from users on the additional growth paths the WBIS can take, which may include new features and functions in order to encourage, attract and provide better service to clinical and public users who require access to ICU related information.

ACKNOWLEDGEMENT

I would like to acknowledge my supervisors Dr Joseph Meloche and Dr Helen Hasan for their continued support, guidance and encouragement during the Masters course of this research. I also acknowledge my family, my father Peter, my mother Jane and my brother Simon for their encouragement and patience during my 7 years of overseas study life. In addition, I would like to acknowledge all my friends in Hong Kong and Australia, as well as my work colleague, especially Ricky in United Kingdom all who have provided me with a lot of feedback, and have helped me in completing this thesis.

I would like to further develop my knowledge within the Information Service Provision. The main focus of this thesis is on the Intensive Care Coordination Health Information Services from a user's perspective. The research conducted here has sought to actively engage the participants in the research process. I would like to acknowledge all their efforts in contributing to this work. My motivation for undertaking this application has enabled me to further develop my research skills and to engage in a research project that may provide tangible benefits to the Health Care Communities.

OVERVIEW OF THE THESIS CHAPTERS

In Chapter 1, the research's framework is introduced to form and support the basis for the study. The main question asked by this study is: What are the perceived information needs of clinical professionals working in Intensive Care Units (ICUs) in New South Wales, Australia, which can usefully be accommodated with Web-based Information Systems (WBIS)? In Chapter 1 the background to the study and significance are explored and refined.

In Chapter 2, the main literature review covers the literature on WBIS. Due to rapid increase in the availability of Web-based services there is an increasing expectation for health care services to be provided in this manner; WBIS in health care have already had a significant impact in promoting a more uniform approach to using information and communications technologies in the health care sector.

In Chapter 3, the main literature review covers the literature on health care WBIS; it introduces the health care Web-based services that are using WBIS to provide health care information and services through the internet.

In Chapter 4, a longer discussion about using Activity Theory in this study occurs, in terms of its usefulness for the investigation, and its applicability to the study of WBIS and Web-based health care services. The examination of Activity Theory includes a brief review of its history and an exploration of some of the key theorists so as to provide a context and a clarification of its purpose.

In Chapter 5, the discussion of the reasons behind the selection of methodologies continues with an emphasis on how the adoption of these methodologies, based on the techniques that they include such as the concourse, and Q Sort, and how they allow this research to achieve its desired outcome.

Chapter 6 discusses the structure of existing WBIS and the problems identified for the existing Web services based on 4 topic areas: Services, Function, Design and Output.

In Chapter 7, the methodology and the data provided by the study is examined in greater detail and the initial analysis of the data of user perceptions of the perceived usefulness of an evolving health care Web-based services community using Q-methodology is done. The results for users are examined and suggestions for improvement of the service are offered.

In Chapter 8, the analysis uses cross factor comparisons and summaries from all the factors from the four areas studied namely, Services, Function, Design and Output, to highlight suggested improvements to the site; of note is the attention paid to information needs of end-users, clinical staff, medical staff and patients. The suggestions include improving the accessibility and sharing of information between ICUs; thus, a value-adding component to WBIS to ensure the WBIS is relevant to the working experience of the ICUs.

In Chapter 9, an evaluation and implication of the previous chapters occur and a discussion of insights drawn from the results for future Web-based health care development.