

ONLINE COMMUNICATION SATISFACTION IN USING AN INTERNET-BASED
INFORMATION MANAGEMENT SYSTEM AMONG EMPLOYEES AT FOUR
RESEARCH UNIVERSITIES IN MALAYSIA

MOHD AZUL MOHAMAD SALLEH

Doctor of Philosophy

UNIVERSITY OF ADELAIDE

2013

ONLINE COMMUNICATION SATISFACTION IN USING AN INTERNET-BASED
INFORMATION MANAGEMENT SYSTEM AMONG EMPLOYEES AT FOUR
RESEARCH UNIVERSITIES IN MALAYSIA

Submitted by

Mohd Azul Mohamad Salleh
Master in Corporate Communication
Universiti Putra Malaysia
Master in Computer Science
Universiti Malaya
Bachelor in Information Technology
Universiti Kebangsaan Malaysia

A thesis submitted in fulfilment of the requirement for the degree of

Doctor of Philosophy
Discipline of Media
Faculty of Social Sciences and Humanities
University of Adelaide

December 2013

Table of Contents

Table of Contents	ii
List of Abbreviations	viii
List of Tables	xii
List of Figures	xiv
Abstract	xv
Declaration	xvii
Acknowledgements	xviii
List of Publications	xix
Chapter 1 Introduction	
1.0 Introduction	1
1.1 Background of the study	8
1.2 Rationale of the study	14
1.3 Aims of the study	18
1.4 Research questions	19
1.5 Research design	22
1.6 Significance of the study	25
1.7 Outline of the thesis	32
1.8 Summary	34
Chapter 2 Higher Education Reform in Malaysia	
2.0 Introduction	35
2.1 Background of higher education in Malaysia	38
2.2 Mission of the public higher education sector	41
2.3 The national higher education strategic plan for quality outcomes	44

2.4 Research universities in Malaysia	46
2.5 The use of ICT applications in education	49
2.6 IBIMS in research universities	53
2.7 Summary	59
Chapter 3	Conceptual Framework and Hypothesis
3.0 Introduction	61
3.1 Background	62
3.2 Several factors in technology usage and changes	66
3.3 Technology usage and acceptance in Malaysia	68
3.4 The conceptual framework and hypotheses of the study	72
3.4.1 Technology acceptance model (TAM)	73
3.4.2 Interactivity features	76
3.4.3 Online collaboration elements	81
3.4.4 Usability of the system	83
3.4.5 Information system quality (IS Quality)	85
3.4.6 Online communication satisfaction	87
3.4.7 Attitude towards use and intention to use IBIMS	90
3.5 Summary of research hypotheses	92
3.6 Summary	94
Chapter4	The Mixed Method Research Design and Process
4.0 Introduction	95
4.1 Research process	95
4.2 Methodology of the study	97
4.3 The mixed methods sequential explanatory research approach	98

4.4 Phase 1: Quantitative research method	100
4.4.1 Participants and procedures	100
4.4.2 The instrument development	101
4.4.3 Pilot test	104
4.4.4 Data collection and analysis	105
4.4.5 Validity	107
4.4.6 Reliability	114
4.5 Phase 2: Qualitative research method	116
4.5.1 The in-depth interview	117
4.5.2 Development of questions	118
4.5.3 The interviews	120
4.5.4 Data transcription, coding and analysis	120
4.5.5 Open-ended questionnaire	121
4.6 Ethics approval for this research	122
4.7 Summary	123

Chapter 5 Quantitative Results in Understanding Online Communication Satisfaction and Attitude when Using IBIMS

5.0 Introduction	124
5.1 Levels of analysis in the procedure in measuring hypotheses	126
5.2 Profile of respondents	128
5.3 Descriptive results	130
5.4 Testing the hypotheses	133
5.4.1 Research question 1: Hypothesis 1 and Hypothesis 2	135
5.4.2 Research question 2: Hypothesis 3	138
5.4.3 Research question 3: Hypothesis 4, Hypothesis 5 and Hypothesis 6	139

5.4.4 Research question 4: Hypothesis 7 and Hypothesis 8	141
5.4.5 Hypothesis 9: Attitude towards Use (ATU) vs Intention to Use (ITU)	143
5.5 Summary of the hypotheses	144
5.6 Summary	145
Chapter 6 Qualitative Findings in Understanding Online Communication Satisfaction and Attitude to Use of IBIMS	
6.0 Introduction	147
6.1 In-depth interview objectives	149
6.2 Findings of phase 2	150
6.2.1 Usefulness of the system	151
6.2.2 Ease of use of the system	153
6.2.3 Interactivity features in the system	154
6.2.4 Usability of the system	157
6.2.5 IS quality of the system	159
6.2.6 IS quality of the system in facilitating collaboration	161
6.2.7 Online communication satisfaction	162
6.2.8 Attitude towards using the system	166
6.2.9 Intention to use the system	167
6.3 Summary	168
Chapter 7 IBIMS in Managing Research Universities' Core Business	
7.0 Introduction	170
7.1 General use of IBIMS by employees	170
7.1.1 Management and administration	170
7.1.2 Teaching and learning	173

7.1.3 Research and innovation	176
7.2 Academics' conceptualisation of role of IBIMS in research management	178
7.2.1 Functionalities of the IBIMS	179
7.2.2 Management of individual research tasks	180
7.2.3 Collaboration in research	182
7.2.4 The impact on research performance	185
7.2.5 Individual research profile productivity	187
7.2.6 Research group and institutional reputation	189
7.2.7 Organization's management of research	191
7.2.8 Lack of IBIMS functionalities	193
7.2.9 Expectations of IBIMS functionalities	195
7.3 Summary	196
Chapter 8 Discussions of the Study	
8.0 Introduction	197
8.1 Effect of IBIMS usefulness on online communication satisfaction	198
8.2 Effect of ease of use on online communication satisfaction	199
8.3 Effect of interactivity features on online communication satisfaction	200
8.4 Effect of usability on online communication satisfaction	202
8.5 Effect of IS quality on online communication satisfaction	203
8.6 Effect of IS quality in facilitating collaboration on online communication satisfaction	205
8.7 Effect of online communication satisfaction on attitude towards and intention to use IBIMS	206
8.8 Relationship between attitude towards use and intention to use IBIMS	208
8.9 Other factors effecting employees' use of IBIMS	210

8.10 IBIMS acceptance and usage in managing research-related activities	214
8.11 Limitations in functionality	217
8.12 Employees' needs to perceive online communication satisfaction and IBIMS usage	219
8.13 Summary	220

Chapter 9 Conclusions and Future Implications

9.0 Introduction	221
9.1 Main findings of the study	222
9.2 Implications of the study	223
9.3 Problems faced in conducting this study	225
9.4 Limitations of the study	226
9.5 Future research directions	226
9.6 Summary	228

Bibliography

Appendices

List of Abbreviations

ATU	Attitude Towards Use
CGPA	Cumulative Grade Point Average
Colla	IS Quality to Facilitate Collaboration
CRIM	Centre for Research and Innovation Management
CSQ	Communication Satisfaction Questionnaire
CV	Curriculum Vitae
DD	Deputy Dean
DVP	Deputy Vice President
e-business	Electronic Business
e-commerce	Electronic Commerce
e-cuti	Electronic Leave System
e-governance	Electronic Governance
e-government	Electronic Government
e-learning	Electronic Learning
ELX	Electronic Labour Exchange
EOU	Ease of Use
eP	Electronic Procurement
e-Rep	Electronic-Repository (e-Penerbitan)
eservices	Electronic Services
e-SPEL	Electronic-Training Management System (Sistem Pengurusan Latihan)
GOE	Generic Office Environment
GRA	Graduate Research Assistant
GSS	Group Support System
HE	Higher Education

HRMIS	Human Resource Management Information System
IBIMS	Internet-Based Information Management System
ICT	Information and Communication Technology
IF	Interactivity Features
IIUM	International Islamic University Malaysia
IMS	Information Management System
IS	Information System
ISQ	Information System Quality
IT	Information Technology
ITU	Intention to Use
KM	Knowledge Management
KMO	Kaiser-Meyer-Olkin
KPI	Key Performance Index
LMS	Learning Management System
MA	Master
MIS	Management Information System
MOHE	Ministry of Higher Education
MRU	Malaysian Research University
MSC	Multimedia Super Corridor
NITA	National Information Technology Agenda
NITC	National Information Technology Council
OCS	Online Communication Satisfaction
PEOU	Perceived Ease of Use
PhD	Doctor of Philosophy
PMS	Project Monitoring System
PU	Perceived Usefulness

R & D	Research and Development
R & I	Research and Innovation
RU	Research University
SKU	University Financial System (Sistem Kewangan Universiti)
SMPU	Research University Information System (Sistem Maklumat Penyelidikan Universiti)
SMS	Short Messages System
SOP	Standard Operating Procedures
SPIN	Interactive Teaching and Learning Management System
SPM	Malaysian Certificate of Education (Sijil Pelajaran Malaysia)
SPPB	Continuing Professional Development System (Sistem Pembangunan Profesional Berterusan)
SPSS	Statistical Package for the Social Sciences
STPM	Malaysian Higher School Certificate (Sijil Tinggi Persekolahan Malaysia)
TAM	Technology Acceptance Model
TRA	Theory of Reasoned Action
U	Usefulness
U.S.	United State
U3P	Research Management Centre Information System (Sistem Maklumat Pusat Pengurusan Penyelidikan)
UiTM	Universiti Teknologi Mara
UKM	Universiti Kebangsaan Malaysia
UM	Universiti Malaya
UMK	Universiti Malaysia Kelantan
UMP	Universiti Malaysia Pahang

UMS	Universiti Malaysia Sabah
UMT	Universiti Malaysia Terangganu
UniMAP	Universiti Malaysia Perlis
Unimas	Universiti Malaysia Sarawak
UniSZA	Universiti Sultan Zainal Abidin
UPM	Universiti Putra Malaysia
UPNM	Universiti Pertahanan Nasional Malaysia
UPSI	Universiti Pendidikan Sultan Idris
USA	Usability
USIM	Universiti Sains Islam Malaysia
USM	Universiti Sains Malaysia
UTeM	Universiti Teknikal Malaysia Melaka
UTHM	Universiti Tun Hussein Onn Malaysia
UTM	Universiti Teknologi Malaysia
UUM	Universiti Utara Malaysia
VC	Virtual Community
VIF	Variable Inflation Factor
WCM	Web-based Communication Mode
WKC _s	Web-based Knowledge Communities
WWW	World Wide Web

List of Tables

Table 2.1: Public universities in Malaysia	42
Table 2.2: Example of IBIMS in four MRUs	56
Table 3.1: Summary of research hypotheses	93
Table 4.1: Five-point Likert Scale	103
Table 4.2: Summary of data collection at MRUs	106
Table 4.3: Factor loading of usefulness	108
Table 4.4: Factor loading of ease of use	109
Table 4.5: Factor loading of interactivity features	109
Table 4.6: Factor loading of usability	110
Table 4.7: Factor loading of information system quality	111
Table 4.8: Factor loading of online communication satisfaction	112
Table 4.9: Factor loading of attitude towards use	112
Table 4.10: Factor loading of intention to use and actual usage	114
Table 4.11: Factor loading of intention to use and actual usage without ITUNAU77	114
Table 4.12: Reliability and variables before factor analysis	115
Table 4.13: Reliability and variables after factor analysis	116
Table 4.14: The questions for the interviews	119
Table 4.15: Summary of respondents' demographic details	120
Table 5.1: Types of analyses used to test the hypotheses	128
Table 5.2: Demographics data	129
Table 5.3: Experience in using computers and the Internet	130
Table 5.4: Mean and standard deviation (n=223)	131
Table 5.5: Collinearity statistics of predictors	134
Table 5.6: Model summary	136

Table 5.7: The results of the regression analysis	136
Table 5.8: Coefficients	137
Table 5.9: Simple linear regression analysis for online communication satisfaction (OCS) and interactivity features (IF)	138
Table 5.10: Model summary	139
Table 5.11: The results of the regression analysis	140
Table 5.12: Coefficients	140
Table 5.13: Simple linear regression analysis for attitude towards use (ATU) and online communication satisfaction (OCS)	142
Table 5.14: Simple linear regression analysis for intention to use (ITU) and online communication satisfaction (OCS)	143
Table 5.15: Simple linear regression analysis for attitude towards use (ATU) and intention to use (ITU)	143
Table 5.16: Summaries of hypotheses	144

List of Figures

Figure 3.1: The conceptual framework	73
Figure 3.2: Technology Acceptance Model	75
Figure 3.3: The outcome interactivity theory	78
Figure 3.4: The updated DeLone and McLean IS success model (2003)	86
Figure 3.5: Summary of research hypotheses	93
Figure 4.1: Overview of the research process	96
Figure 4.2: The mixed methods sequential approach	99
Figure 5.1: Overview of the quantitative data analysis	125
Figure 5.2: Levels of analysis	126
Figure 5.3: Significant relationships	145
Figure 6.1: Overview of the qualitative analysis	148
Figure 8.1: The integration of IBIMS with research management	215

Abstract

The acceptance and adoption of Internet applications or online systems such as Internet-based Information Management Systems (IBIMS) relies not only on just technological judgement, but includes significant social and organisational factors. The purpose of this study is to investigate, explore and understand the use of IBIMS by employees in Malaysian research universities. This study examined the effects of the perceived usefulness, ease of use, interactivity features, usability and information system (IS) quality on employees' online communication satisfaction (OCS) toward use of IBIMS. It meant measuring their satisfaction with online communication in using systems. This study makes significant contributions and adds new knowledge to the subject of technology acceptance, adoption and its usage, especially the empirical and practical implications for employing IBIMS in Malaysia's higher education and research-based university.

A mixed method research approach was used (combining quantitative and qualitative method) to provide a wider perspective on the topic being studied. This method comprised a survey, an in-depth interview and open-ended questionnaire to collect data from two employee groups (academics and administrative staff) in four pioneer Malaysian research universities (MRUs). The aim is to validate the theoretical framework and hypotheses empirically using a survey and in-depth interview analysis. These methods were important for a triangulation strategy concerning IBIMS. Furthermore the open-ended questionnaire added rich data that enhances an understanding of the adoption of IBIMS in the research context, especially by academic staff.

This study revealed the importance of using the mixed method approach to understand the employment of IBIMS in Malaysian research universities. Usefulness, ease of use, interactivity features, usability and IS quality significantly influence employees' perceptions of OCS and just how successful IBIMS is. The results showed that OCS does

contribute to enhanced employees' attitudes and intention to use IBIMS. However, the qualitative findings described not only the technological importance of enhancing users' OCS, but also highlighted several human and social factors and organisational initiatives. Then, in the research university, IBIMS are important to academics or researchers for managing their research work such as research input (e.g., people, financial matters), research processes (e.g., collaboration) and research output/outcome (e.g., publications, patents, inventions). Therefore identifying factors involved in successful uptake are important, not just for individual universities but for the national agenda.

The findings in this thesis provide significant and valuable information on technology acceptance, especially to scholars, information system consultants, information technology managers, senior management of MRUs, and ultimately the Ministry of Higher Education in Malaysia. This study has sought to explain the use of Internet-based systems and online systems in the higher education sector with the objective of making recommendations on technology being implemented in administration, teaching, learning, and research.

Finally, this study is the first empirical analyses to examine and understand the success factors that shape OCS concerning IBIMS in MRUs. The significance, implications and future research directions are also discussed in this thesis.

Declaration

I certify that this work contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. In addition, I certify that no part of this work will, in the future, be used in a submission for any other degree or diploma in any university or other tertiary institution without the prior approval of the University of Adelaide and where applicable, any partner institution responsible for the joint-award of this degree.

I give consent to this copy of my thesis, when deposited in the University Library, being made available for loan and photocopying, subject to the provisions of the Copyright Act 1968.

I also give permission for the digital version of my thesis to be made available on the web, via the University's digital research repository, the Library catalogue and also through web search engines, unless permission has been granted by the University to restrict access for a period of time.

Signed :

Mohd Azul Mohamad Salleh

Date :

Acknowledgement

I would like to express my gratitude and appreciation to the many people who helped me during my long journey and years of study. Without all of you, this wonderful journey would not be completed.

First of all, I would like to thank to my principal supervisor, Associate Professor Dr Mary Griffiths who guided and supported me to the completion of this thesis and study. Thank you for your guidance and encouragement.

I also express my appreciation to my co-supervisor, Associate Professor Dr Ming Cheung; and to my former co-supervisor, Associate Professor Dr Rob Cover, who had helped me during the early stage of the study. Thank you also to the examiners, for the reports, suggestions and comments.

Secondly, I would like to thank my professional editors especially Phil Thomas and Alan Skilbeck. To all my friends, especially in Media Discipline, including the Malaysian postgraduate students, thank you.

Thirdly, this appreciation is also to the Universiti Kebangsaan Malaysia (UKM) and the Malaysian Government, specifically to Ministry of Higher Education Malaysia (MOHE) for the scholarship.

I give a very special thank you to my beloved wife, Nor Azita Ghani for your support, prayers and encouragement.

Thank you also to my children, Muhamad Aqil Iman and Nor Amalia Marsya for understanding my work. Finally, thank you to my dearest mother, Zalilah Mamat, for your prayers and patience toward the end my study. Thank you.

List of Publications

Journal and Chapter in Book

1. Mohd Azul Mohamad Salleh (2013), 'User's experiences of Internet-based systems in Malaysian research universities: Success factors and barriers as starting points to best practices in a developing country', in JR Gil-Garcia (ed), *E-Government Success around the World: Cases, Empirical Studies, and Practical Recommendations* . IGI-Global.
2. Mohd Azul Mohamad Salleh (2012), 'The Impact of interactivity features in enhancing online communication satisfaction', *Malaysian Journal of Communication*, vol. 28, no. 2, pp. 21-36.

Conference Papers

1. Mohd Azul Mohamad Salleh, 2011, '*Online communication satisfaction towards the use of Internet-based information management systems (IBIMS): A case at research universities in Malaysia*', Inaugural Malaysia Postgraduate Conference 2011, 26 – 27 November 2011, University of South Australia, South Australia.
2. Mohd Azul Mohamad Salleh, 2010, '*The effect of interactivity to communication satisfaction in using Internet-based information management systems (IBIMS) in organisations*', Postgraduate Conference on Media and Communication, 22 July 2010, The University of Adelaide, South Australia.
3. Mohd Azul Mohamad Salleh, 2009, 'Online collaboration as a determinant for communication satisfaction in using Internet-based information management systems in organisations', *Proceeding of International Conference on Media and Communication (MENTION2009)*, The National University of Malaysia, Malaysia.

Seminar Paper

1. Mohd Azul Mohamad Salleh, 2011, '*Online communication satisfaction in using Internet-based information management systems (IBIMS)*', Media Research Seminar, 27 October 2011, The University of Adelaide.