

FUNCTIONAL REQUIREMENTS OF MOBILE APPLICATION FOR FISHERMEN

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Universiti Utara Malaysia

2013

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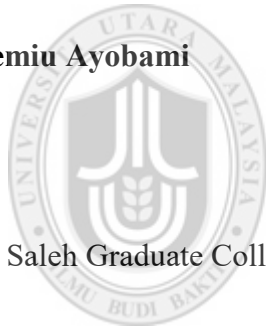
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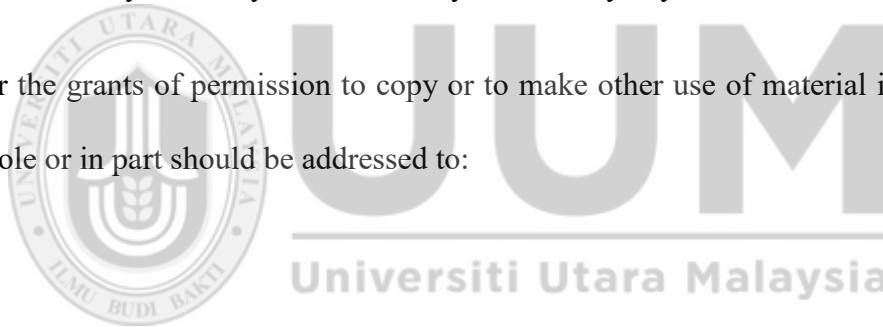


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DEDICATION

I dedicate this research project report to all who are losing hope or have lost hope in becoming great in life because of trials and tribulations.

They must revive the hope, and believe that breathing in and out as a living human must continuously re-kindle the light of hope. Believe in yourself, set your goal, work as if you will not pray, and pray as if you will not work.



ABSTRACT

Generally, un-usable information technology products and its unacceptability have been traced to the inability of the tech products to meet the needs and desire of the users, for whom the products are provided. And specifically, the Malaysia government has been recording same users neglect on information technological infrastructure provided despite huge amount of money invested on the ICT project, most especially for the rural dwellers. The major reason of this users' unacceptability have been traced to lack of proactive users' requirements gathering as expected to be part of the product development process. To address this in the intending development of mobile application for fishermen; who are also members of the target group to be provided mobile technologies by the Malaysian government; this study aims to validate the functional requirements of mobile applications for fishermen using a Qualitative-biased users' participatory design methodology which included a prototype development process. The result of the study shows that ability to get weather updates, real time market price and general fishing tips are validated functional requirements of a mobile application centered to be used by fishermen.

Keywords: user-centered, mobile application, functional requirements, fishermen

ABSTRAK

Secara umumnya, banyak produk-produk teknologi maklumat (IT) yang dibangunkan tidak mencapai tahap kepenggunaan dan tahap keberkesannya terhadap pengguna-pengguna, mungkin disebabkan tidak memenuhi kehendak pengguna atau alasan lain.

Khususnya kepada kerajaan Malaysia, walaupun sejumlah wang besar telah dilabur kepada projek ICT, terutamanya kepada penduduk luar bandar, namun masih ramai pengguna yang mengabaikan infrastruktur teknologi maklumat (IT) yang telah disediakan dan cuba dibangunkan untuk kemudahan bersama.

Sala satu faktor utama yang menyumbang kepada perkara diatas berlaku adalah kurangnya cara yang efektif dan proaktif dalam mengumpul keperluan dan kehendak pengguna seperti mana yang difahami bahawa proses pengumpulan maklumat dan keperluan adalah prosedur yang penting dalam membangunkan sesebuah produk.

Untuk mengatasi perkara ini, dengan adanya pembangunan aplikasi mobil untuk para nelayan yang mana merupakan salah satu kumpulan target untuk teknologi mobil oleh kerajaan Malaysia; kajian ini adalah untuk mengesahkan keperluan berfungsi untuk mobil aplikasi bagi para nelayan dengan menggunakan kaedah kualitatif yang melibatkan penyertaan pengguna yang juga melibatkan proses pembangunan prototaip.

Hasil keputusan kajian ini menunjukkan pengemaskinian cuaca, harga pasaran, dan tips umum untuk menangkap ikan adalah keperluan berfungsi bagi pembangunan mobil yang akan digunakan oleh nelayan.

Perkataan-utama: tumpuan pengguna, aplikasi mobil, keperluan berfungsi, nelayan

TABLE OF CONTENTS

	Page
DECLARATION	i
PERMISSION TO USE	ii
ACKNOWLEDGEMENT	iii
DEDICATION.....	iv
ABSTRACT.....	v
ABSTRAK	vi
TABLE OF CONTENTS	vii
LISTS OF FIGURES	ix
APPENDICES	Error! Bookmark not defined.
CHAPTER ONE: INTRODUCTORY PART OF THE STUDY	1
1.0 Introduction	1
1.1 Background of the study	1
1.2 Motivation of the study.....	4
1.3 Problem Statement.....	6
1.4 Research Questions.....	7
1.5 Research Objectives.....	7
1.6 Significances of the Research.....	8
1.7 Scope of the Research.....	8
1.8 Summary of the chapter.....	10
CHAPTER TWO: LITERATURE REVIEW	11
2.0. Introduction	11
2.1 Mobile Applications.....	11
2.2 Wireless Client-Server Architecture.....	14

2.3 Requirement Engineering.....	16
2.4 User centred Design.....	17
2.5 Past Related Works	18
2.6 Theoretical Background.....	19
2.7 Summary of the chapter.....	22
CHAPTER THREE: METHODOLOGY	23
3.0 Introduction	23
3.1 Overview	23
3.2 Problem Definition.....	25
3.3 Rapid Application Development	26
3.4 Evaluation.....	29
3.5 Summary of the chapter.....	30
CHAPTER FOUR: PROTOTYPE DEVELOPMENT AND THE FUNCTIONAL REQUIREMENTS VALIDATION.....	31
4.0 Introduction.....	31
4.1 Prototype Development.....	31
4.2 Functional Requirements Validation	40
4.3 Summary of the chapter.....	42
CHAPTER FIVE: DISCUSSION, LIMITATION AND CONCLUSION	43
5.0 Introduction.....	43
5.1 Discussion.....	43
5.2 Limitation.....	45
5.3 Conclusion.....	45
5.4 Summary of the chapter.....	46
REFERENCES	47

LISTS OF FIGURES & TABLE

Page

Client Server Wireless Architecture (Source: Oracle Application Server Concept).....	15
Research model (Adapted Fishbein & Ajzen, 1975).....	21
Research methodological framework.....	25
Extract of the functional requirements from the content analysis.....	32
Use Case Diagram for Request information about weather update.....	32
Use Case Diagram for Request information real time market price.....	34
Use Case Diagram for Request for fishing tips.....	35
General Sequence Diagram.....	36
Activity Diagram.....	37
Overview of the System Architecture.....	38
Sequential flow of the Mobile Interface.....	40
Results of the functional requirements validation.....	42

CHAPTER ONE

INTRODUCTORY PART OF THE STUDY

1.0 Introduction

This chapter serves as the introductory chapter to the entire research study contained in this thesis, thus consists of the background of the study which explains where the study specifically stemmed from, the motivation of the study expressing what brought about the researcher's interest on a general overview, and specifically the problem statement that narrowly pointed to why this study is conducted. Also included in this chapter are the research objectives, research questions, the scope of the research expressing the research coverage, and the significances of the study which highlights the deliverables of this research. In conclusion is a summary that expresses the summarised content of areas covered in this chapter.

1.1 Background of the study

The emergence of internet and its usage for communication and information sharing purposes has undoubtedly brought a sharp shift and enhanced productivity in all human endeavours especially in the academic, business, management and entertainment activities, and it has been indeed utilized to meet up with the global demand, maintain international connectivity, and remain competitive in the fast-changing business world. In its inception, computers are

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REFERENCES

- Babbie, E. (2010). *The Practice of Social Research*, 12th Edition. Wadsworth Cengage Learning, USA.
- CASEMaker (2000). What is Rapid Application Development? CASEMaker Incorporation.
Retrieved from: http://www.casemaker.com/download/products/totem/rad_wp.pdf
- Cha, S., Bernd, J. & Du, W. (2009). Towards a unified framework for mobile applications. Seventh Annual Networks and Services Research Conference. IEEE Computer Society, 978-0-7695-3649-1/09, pp. 209- 216.
- Chenail, R.J. (1995). Presenting Qualitative Data. *The Qualitative Report*, 2(3). Retrieved from <http://www.nova.edu/ssss/QR/QR2-3/presenting.html> on 13/12/2012.
- Creswell, J. (2009). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. SAGE Publication, USA.
- Davis, D. F.; Bagozzi, R.D. & Warshaw, P.R. (1989). User Acceptance of Computer Technology: A comparism of two theoretical models. *Management Science*, 35(8). Retrieved from: http://www.ii.metu.edu.tr/sites/default/files/DavisBagozziWarshaw_MS89_User_Acceptance_of_Computer_Technology.pdf
- Davis, F. D. (1986). A technology acceptance model for empirically testing new end-user information systems: Theory and results. (Doctoral dissertation, Sloan School of Management, Massachusetts Institute of Technology).
- Elizabeth, B. & Sanders, N. (2002). From User-centred to Participatory Design Approaches. In *Design and the Social Sciences*. J.Frascara (Ed.), Taylor & Francis Books Limited, 2002.

- Escalona, M. J., & Koch, N. (2004). Requirement Engineering for Web Applications – A Comparative Study. *Journal of Web Engineering*, 2 (3), 194-212. Retrieved from: <http://www.pst.informatik.uni-muenchen.de/~kochn/KochEscalonaJWE-rev.pdf>
- Finnegan, R. (1996). In *The Open University Collections of Data Collections and Analysis*. SAGE Publications, London.
- Firesmith, D. (2006). Requirement Engineering Tasks. *Journal of Object Technology*, 5(8), 21-29. Retrieved from: http://www.jot.fm/issues/issue_2006_11/column3.pdf
- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior : An introduction to theory and research*. Reading, Mass. ; Don Mills, Ontario: Addison-Wesley Pub & Co.
- Gebauer, J. (2008). *User Requirement of Mobile Technology: A Summary of Research Results*. A working paper of College of Business, University of Illinois, Urbana-Champaign. Retrieved from DOI: <http://citeseerx.ist.psu.edu/viewdoc/summary?doi=?doi=10.1.1.132.8795> on 09/12/09.
- Ghuri, H. (2011). *Mobile Applications for Human Resources*. *Workforce Solution Review*, www.ihrim.org, pp. 14- 17.
- Hawley, M., Cunningham, S., Judge, S. Kolluru, B., Roberston, Z. (2008). Using qualitative research methods to inform user centred design of an innovative Assistive Technology device. A working paper of Dept. of Human Communication, University of Sheffield, UK. Retrieved from [http://eprints.whiterose.ac.uk/10292/1/CWUAAT_paper - Judge et al.pdf](http://eprints.whiterose.ac.uk/10292/1/CWUAAT_paper_-_Judge_et_al.pdf) , on 19/09/12
- Hellstrom, J. (2010). *The Innovative Use of Mobile Applications in East Africa*. Department for Human Development, Team for Knowledge, ICT and Education, SIDA. From:

<http://www.sida.se/publications>;

http://www.texttochange.org/sites/default/files/newsfiles/sr2010-12_sida_hellstrom.pdf

Hirschberg, M. (2007). Rapid Application Development (RAD): A Brief Overview. DoD Data & Analysis Centre for Software.

Ho, H. & Syu, L. (2010). Uses and Gratification of Mobile Application Users. International Conference on Electronics and Information Engineering (ICEIE, 2010), 1, 315-319.

Inquirer Technology (2012). IT expert creates mobile app to warn fisherman-father of bad weather. Posted on Oct, 18, 2012, retrieved from: <http://technology.inquirer.net/19060/it-expert-creates-mobile-app-to-warn-fisherman-father-of-bad-weather>

International Telecommunication Union (ITU-T). (2009). TechWatch Alert. Available at <http://www.itu.int/ITU-T/techwatch>

Kazmierczak, E. (2003). Requirement Engineering. The University of Melbourne Course work for Masters in Software Engineering. Retrieved from: <http://ww2.cs.mu.oz.au/~dmwilm/downloads/641.pdf>

Kourouthanasis, P. E., Giaglis, G. M. & Vrechopoulos, A.P. (2007). Enhancing user experience through pervasive information systems: The case of pervasive retailing. *International Journal of Information Management*, 27, 319-335

Kumar, R. (2011). Research Methodology, a step-by-step guide for beginners. SAGE Publication, Singapore. ISBN: 978-1-84920-300-5.

Malaysia Economic Planning Unit. Information available at the online website: <http://www.epu.gov.my>

Mallalieu, K. & Sankarsingh, C. V. (2012). Evaluation of the mFisheries Applications. Caribbean ICT Research Programme (TT), Retrieved from http://cirp.org.tt/mfisheries/pdf/Evaluation_of_mFisheries_Applications_Report.pdf on 25/11/2012.

Marcus, A. & Gould, E.W. (2000). Cultural dimensions and global user-interface: What? So what? Now what?, Proceedings of 6th Conference on Human Factors and the Web. Retrieved from: <http://www.tri.c.com/hfweb/>.

Marshall, M.N. (1996). Sampling for qualitative research. Family Practice, Oxford University Press, 13 (6), 522-525

Mobile Marketing Association. (MMA). (2008). Mobile Applications, p. 1,

Myers, M. D. (1997). Qualitative Research in Information Systems. *MIS Quarterly* 21(2), 241-242. MISQ Discovery, Archival version.

Neuman, L.W. (2007). Basics of Social Research: Qualitative and Quantitative Approaches, 2nd Edition. Pearson International, USA.

Nuseibeh, B. & Easterbrook, S. (2000). Requirement Engineering: A Roadmap. A working paper of UK EPSRC projects MISE. Retrieved from: <http://mcs.open.ac.uk/ban25/papers/sotar.re.pdf>

Oracle Application Server Concepts. Part No. B13994-01. Retrieved from http://docs.oracle.com/cd/B15904_01/core.1012/b13994/wireless.htm on 02/12/12.

Qualcomm's Wireless Reach Initiative Report; QWRI. (2011). Available at <http://www.oecd.org/dac/aidfortrade/48367406.pdf>

Respect Consortium. (2008). Requirements for HER Systems providing Source for Clinical Research; a User Requirement Document. A project done under the aegis of HER/CR Working Group.

Retrieved from <http://www.eurorec.org/files/filesPublic/ehrworkshop/2008/EHR-CR%20User%20Requirements%20Document%20Release%201.pdf>, on 19/09/12.

S. Murugesan and B.A. Venkatakrisnan. (2005). Addressing the Challenges of Web Applications on Mobile Handheld Devices, *in the Proc. Int'l Conf. Mobile Business (ICMB 05)*, IEEE CS Press, pp. 199–205.

Shneiderman, B. & Plaisant, C. (2010). Designing the User Interface: Strategies for Effective Human-Computer Interaction, Fifth Edition. Pearson, USA.

Singh, S., Bartolo, K.S., Satchell, C. (2004). Grounded Theory and User Requirement: A Challenge for Qualitative Research. Proceedings of International Conference on Qualitative Research in IT & IT in Qualitative Research (QualIT2004). Retrieved from <http://mams.rmit.edu.au/mmm2vc1q1axj.pdf>, on 19/09/12.

Stokes, R. (2011). eMarketing: The essential guide to digital marketing. Fourth Edition. Quirk eMarketing (Pty) Ltd. ISBN: 978-0-620-52066-5

Tullis, T. & Albert, B. (2008). Measuring the User Experience: Collecting, Analyzing and Presenting Usability Metrics, Elsevier Inc, USA.

Unhelkar, B., & Murugesan, S. (2010). The Enterprise Mobile Applications Development Framework, IEEE Computer Society 1520-9202/10, pp. 33- 39

Vliet, H.V. (2007). Software Engineering: Principles and Practice. Wiley. Singapore

Williams, K. & Durrance, J. D. (2010). Community Informatics. *Encyclopaedia of Library and Information Science, Third Edition*. U.S.A. Retrieved from <http://people.lis.illinois.edu/~katewill/williams-durrance-encyclo-community-informatics.pdf>

Wu, T. & Zheng, P. (2006). Developing a Web Service Based Application for Mobile Client. A Master Thesis; Stockholm, Sweden. ICT/ECS-2006-138

Zave, P. (1997). Classification of Research Efforts in Requirements Engineering. *ACM Computing Surveys*, 29(4), 315-321.

