

**MOBILE APPOINTMENT SYSTEM FOR
UNIVERSITIES**

Marwan Ibrahim Ahmad Alshar'e

UNIVERSITI UTARA MALAYSIA 2008



MOBILE APPOINTMENT SYSTEM FOR UNIVERSITIES

A dissertation submitted to the Faculty of Information Technology
in partial fulfillment of the requirement for the degree
Master of Science (Information Technology)
Universiti Utara Malaysia

By

Marwan Ibrahim Ahmad Alshar'e

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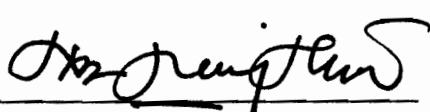
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Graduate Department of Information Technology
College of Arts & Sciences
Universiti Utara Malaysia

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ABSTRACT

This study explores the implementation of mobile based application as a mediator at the educational operations. The usage of the mobile devices becomes more popular recently, and the wireless technology producers provide the markets and customers with various kinds of hardware and applications which allow customers to use these services from anywhere and at any time, and this is the main interest in using the mobile based applications. This study focuses on managing the lecturer consulting hours in order to improve the communication between lecturers and students, which are related to the appointment operations. The study aims to take advantages of the wide usage of the mobile application to solve inefficiency in student-lecturer appointments which exists in University Utara Malaysia (UUM), and to shift the existing appointment management operation from desktop based application to mobile-based application

ACKNOWLEDGEMENTS

First and foremost, all praises to Allah (SWT), that without his Almighty and Merciful I would not have been able to do this work and finish it.

I would like to express profound gratitude to my advisor, Dr. Nor Laily Hashim, for her invaluable support, encouragement, supervision and useful suggestions throughout this research work. Her moral support and continuous guidance enabled me to complete my work successfully.

I am as ever, especially indebted to my parents for their love and affection; they taught me the importance of education and always encouraged me to work harder and better. I also wish to thank my brothers and my sister for their support, help and understanding during my study.

Last but not least, I wish to thanks those tremendous individuals, who have directly and/or indirectly, given me the emotional strength and support needed during the course of my study.

DEDICATION

*I
would Like
to dedicate
this work
as a gift to
my beloved
and forever
supportive
family...*

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Chapter One

Introduction

1.1 Introduction

The uses of computer and internet have enabled the educational institutions to provide their students and staff with various online applications and services to help them to achieve the purpose of any educational operations. The development of mobile technologies has provided new facilities and possibilities to present such services via mobile devices such as mobile phones and PDA's by extending each service to the wireless medium. Kohlenberg et al. (2006) declared on that more researchers focused on the new way of providing the information (from any where and at any time). From Koyama et al. (2001) view point the cellular phone is the most common information terminal that people can use from any where and at any time. Therefore the educational institutions can offer the students especially those who cannot always have access to computer or internet to get important information from their academic institutions. Evangelos et al. (2006) explained that the main ideas of applying the mobile based applications are to support the educational operations to can supply the learners with a helping hand to get access to educational information sources, Evangelos et al. (2006) provide some examples of applying the web applications to serve the educational process such as announcement, course schedule, grads and user directory details. In the other

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References

Ali, N. H., Shukur, Z., & Idris, S. (2007). *A Design of an Assessment System for UML Class Diagram*, Paper presented at the Fifth International Conference on Computational Science and Applications.

Ally, M., & Fahy, P. (2002). *Using students' learning styles to provide support in distance education*. Paper presented at the Eighteenth Annual Conference on Distance Education Teaching and Learning, Madison, Wisconsin.

Anda, B., & Sjoberg, D. I. K. (2003). *Applying Use Cases to Design versus Validate Class Diagrams A Controlled Experiment Using a Professional Modeling Tool*. Paper presented at the Empirical Software Engineering, Proceedings. 2003 International Symposium.

Anido-Rifón, L., Aguado-Agelet, F., & Folgueiras-Artíme, O. (2001). A Web-based Management Tool for Health Care Services with Appointment Required. *World Wide Web Conference Series*.

Balakrishnan, S., & Kohlenberg, J. (2005). A New and Efficient Approach for providing Ubiquitous Computing within a Campus. *IPSIPescara*.

Bennett, S., McRobb, S., & Farmer, R. (2006). *Object-Oriented system Analysis And Design using UML* (Third ed.): Mc Graw Hill.

Brdjanin, D., & Maric, S. (2007). *An Example of Use-Case-driven Conceptual Design of Relational Database*. Paper presented at The International Conference on “Computer as a Tool”.

Chan, T., Sharples, M., Vavoula, G., & Lonsdale, P. (2004). *Educational Metadata for Mobile Learning*. Paper presented at the Proceedings of The 2nd IEEE International Workshop on Wireless and Mobile Technologies in Education.

Chepchieng, M. C., Mbugua, S. N., & Kariuki, M. W. (2006). University students' perception of lecturer-student relationships: a comparative study of Public and Private Universities in Kenya. *Educational Research and Reviews*, 1, 80-84.

Divitini, M., Haugalokken, O. K., & Norevik, P.-A. (2002). *Improving communication through mobile technologies: which possibilities*. Paper presented at the Wireless and Mobile Technologies in Education, 2002. Proceedings. IEEE International Workshop

Edwards, M. A., & Clear, F. (2001). Supporting the Collaborative Learning of Practical Skills with Computer Mediated communications Technology. *Educational technology & Society*.

Eichelberger, H. (2002). *Aesthetics of Class Diagrams*. Paper presented at the Proceedings of the First International Workshop on Visualizing Software for Understanding and Analysis.

Embassy, U. S. (2007). online internet based system for non- immigrant visa appointments. Retrieved 2 February, 2008

Firesmith, D. G. (1999). *Use Case Modeling Guidelines*. Paper presented at the Technology of Object-Oriented Languages and Systems, 1999. TOOLS 30. Proceedings

Genero, M., Piattini, M., & Calero, C. (2002). *Empirical Validation of Class Diagram Metrics*. Paper presented at the Proceedings of the 2002 International Symposium on Empirical Software Engineering.

Genero, M., Piattini, M., & Jiménez, L. (2001). *Empirical Validation of Class Diagram Complexity Metrics*. Paper presented at the Computer Science Society, 2001.

SCCC 2001. Proceedings. XXI International Conference of the Chilean.

Gomaa, H. (2004). *Designing Software Product Lines with UML: From Use Cases to Pattern-Based Software Architectures*: Addison Wesley.

Grace, M., & Gay, G. (2001). Web Browsing Mobile Computing and Academic Performance. *Educational Technology and Society*.

Gueheneuc, Y.-G. e. (2004). *A Systematic Study of UML Class Diagram Constituents for their Abstract and Precise Recovery*. Paper presented at the Proceedings of the 11th Asia-Pacific Software Engineering Conference.

Haywood, E., & Dart, P. (1996). *Analysis of Software System Requirements Models*. Paper presented at the Software Engineering Conference, 1996. Proceedings of 1996 Australian, Melbourne, Vic.

Jacobson, I., Christerson, M., Jansson, P., & Overgaard, G. (1992). *Object-Oriented Software Engineering: A Use Case Drive Approach*: Addison-Wesley.

Jacobson, I., & Ng, P.-W. (2004). *Aspect-Oriented Software Development with Use Cases*: Addison Wesley Professional.

Kohlenberg, J., Parthaban, M., & Balakrichenam, S. (2006). *Peer-to-Peer Platform for Anytime /Anywhere Connectivity in Educational Environments*. Paper presented at the Computing in the Global Information Technology, 2006. ICCGI '06. International Multi-Conference.

Koole, M., & Ally, M. (2006). *Framework for the Rational Analysis of Mobile Education (FRAME) Model: Revising the ABCs of Educational Practices*. Paper presented at the Networking, International Conference on Systems and International Conference on Mobile Communications and Learning Technologies, 2006.

Koyama, A., Sasaki, A., Barolli, L., & Cheng, Z. (2001). *An Agent Based Education System for Cellular Phone*. Paper presented at the Database and Expert Systems Applications, 2001. Proceedings. 12th International Workshop

Kurtz, B. D., Woodfield, S. N., & Embley, D. W. (1990). *Object-Oriented Systems Analysis and Specification: A Model-Driven Approach*. Paper presented at the Compcon Spring '90. 'Intellectual Leverage'. Digest of Papers. Thirty-Fifth IEEE Computer Society International Conference.

Kusumoto, S., Matukawa, F., & Inoue, K. (2004). *Estimating Effort by Use Case Points: Method, Tool and Case Study*. Paper presented at the Software Metrics, 2004. Proceedings. 10th International Symposium

Larman, C. (2001). *Applying UML and Patterns An Introduction to Object-Oriented Analysis and Design and the Unified Process* (second ed.): Prentice Hall.

Lehner, F., & Nösekabel, H. (2001). *The role of mobile devices in E-Learning first experiences with a wireless E-Learning environment*. Paper presented at the Wireless and Mobile Technologies in Education, 2002. Proceedings. IEEE International Workshop

Lu, K. M., & Hamid, S. H. A. (2007). *Conceptual Design of Web-Based Appointment Management System using Object WebML*. Paper presented at the Information Technologies and Applications in Education, 2007. ISITAE '07. First IEEE International Symposium

Marcela Genero, M., Manso, E., & Cantone, G. (2003). *Building UML Class Diagram Maintainability Prediction Models Based on Early Metrics*. Paper presented at the Proceedings of the Ninth International Software Metrics Symposium.

McLaughlin, B. D., Pollice, G., & West, D. (2006). *Head First Object-Oriented Analysis & Design*: O'REILLY.

Medicine, U. o. W. S. o. (2006).

Online News. Retrieved 5 February, 2008, from
<http://uwmedicine.washington.edu/NR/rdonlyres/A0CA5761-DDEC-4D33-A390-A7AA12E50DA1/0/ON02306.pdf>

Mustafa, Y. (2004). E-Health Centre: a web-based tool to empower patients to become proactive customers. *Health Libraries Group 2004 Health Information and Libraries Journal*, 21, 129-133.

Odeh, M., Hauer, T., McClatchey, R., & Solomonides, T. (2003). A Use-Case Driven Approach in Requirements Engineering : The Mammogrid Project. Paper presented at the 7th IASTED Int Conf on Software Engineering Applications, Marina del Rey, USA

O'Docherty, M. (2005). *Object-Oriented Analysis and Design: Understanding System Development with UML 2.0*: John Wiley & Sons Ltd.

Phillips, C., Kemp, E., & Kek, S. M. (2001). *Extending UML Use Case Modeling to Support Graphical User Interface Design*. Paper presented at the Software Engineering Conference, 2001. Proceedings. 2001 Australian.

Ramdsen, P. (1992). *Learning to Teach in Higher Education*. London: Routledge.

Rosenberg, D., & Scott, K. (2001). *Applying Use Case Driven Object Modeling with UML: An Annotated e-Commerce Example* (first ed.): Addison Wesley

Sakkopoulos, E., Lytras, M., & Tsakalidis, A. (2006). Adaptive Mobile Web Services Facilitate Communication and Learning Internet Technologies. *Education, IEEE Transactions*, 49, 208-215.

Shen, W., Guizani, M., Yang, Z., Compton, K. J., & Huggins, J. (2004). *Execution of A Requirement Model in Software Development*.

Soo, S. C. (2002). *Computer Mediated Communication – Email Group to Facilitate Student Learning*. Paper presented at the HERDSA 2002 conference proceedings.

Stankovid, R. S., Moraga, C., & Astola, J. T. (2005). *Fourier Analysis on Finite Groups with Applications in Signal Processing and System Design*: Wiley-IEEE Press.

Sun, D., & Kenny Wong. (2005). *On Evaluating the Layout of UML Class Diagrams for Program Comprehension*. Paper presented at the Proceedings of the 13th International Workshop on Program Comprehension.

Suyono, H., Nor, K. M., Yusof, S., & Rashid, A. H. A. (2006). *Use-case and Sequence Diagram Models for Developing Transient Stability Software*. Paper presented at the First International Power and Energy Conference.

Vaishnavi, V., & Kuechler, B. (2005). *Design Research in Information System*. Paper presented at the Association for Information System.

Vavoula, G., & Sharples, M. (2002). *a personal, mobile, knowledge and learning organization system*. Paper presented at the Wireless and Mobile Technologies in Education, 2002. Proceedings. IEEE International Workshop

Wasson, C. S. (2006). *System Analysis, Design, and Development Concepts, Principles, and Practices*: A John Wiley & Sons, Inc.

Xu, J., Yu, W., Rui, k., & Butler, G. (2004). *Use case refactoring: a tool and a case study*. Paper presented at the Software Engineering Conference, 2004. 11th Asia-Pacific.

Zamir, S. (1999). *Handbook of Object Technology*: CRC Press.

Zhihong, Z., & Mingtian, Z. (2003). *Some Considerations in Formalizing UML Class Diagrams with Description Logics*. Paper presented at the International Conference on Robotics Intelligent Systems and Signal Processing, Changsha, China.