

**SERVICES VIA MOBILITY PORTAL
FOR
UNIVERSITY UTARA MALAYSIA**

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SERVICES VIA MOBILITY PORTAL
FOR
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A thesis submitted to the Graduate School in partial
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By

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ABSTRACT

The technology such as mobile has become an important medium for people to communicate between each other. This research used the Object Oriented Methodology (OOM) as a guideline. The goal of this research project is to develop Mobile Portal System for UUM Information Services using Wireless Application Protocol (WAP) technology that supports the use of smart phones devices for the benefit of the public. A brief overview of several mobile technologies is presented. The development process and problems encountered when designing the prototype of the Mobile Portal System is discussed in this paper. The usability testing conducted in this research revealed that the WAP site application is effective and should be implemented for UUM Mobile Portal System.

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CHAPTER 1

INTRODUCTION

1.1 Background

The advancement in information technology has changed the communication process among the people around the world. The technology such as mobile and portal has become an important medium for people to communicate between each other. Many people already have good knowledge and experiences in using mobile devices in wireless or wired in particular of Internet applications. In interactive systems, to which data services belong to as well, customer orientation becomes more and more a fundamental user orientation. The user interface is the most important representation of the company. That means, in the context of mobile services it is the mobile communication to the customer. If the usability of the interface is bad, customers will not be able to utilize the system. Thus, they will terminate the running transaction and find the alternative providers.

The mobile devices and the emergence of wireless technologies are rapidly increasing. Firms adopted mobile devices and wireless technologies to assist and improve their business' performances. Today even small mobile devices access the

The contents of
the thesis is for
internal user
only

REFERENCES

- Alan Dennis, Barbara Wixom & David Tegarden, (2004). System Analysis And Design With UML Version 2.0: An Object-Oriented Approach, Second Edition.
- Amor, D. (2002). Internet future Strategies: How pervasive computing services will change the world. USA: Prentice Hall.
- Antovski, L. and Gusev, M. (2003). M-Payments. Information Technology Interfaces, 2003. ITI 2003. Proceedings of the 25th International Conference, 95 – 100.
- Asano, H., Sumi, A.O., Ramzan, Z. & Zhu, J. (2002). Wireless Electronic Commerce Security Sponsored By Nokia. Retrieved June 24, 2006 from <http://theory.lcs.mit.edu/~zulfikar/papers/NokiaFinalNoConclusion1205.pdf>
- B. Bruegge & A.H. Dutoit, (2000). Object-Oriented Software Engineering—Conquering Complex and Changing Systems. Prentice Hall.
- Bhushan, N. & Subbarao, V. (2002). Mobile Commerce: Killer Applications. Retrieved June 16, 2006 from http://www.infy.com/knowledge_capital/thought-papers/mcommerce.pdf
- Cervera, A. (2002). Analysis of J2ME for developing Mobile Payment Systems, Retrieved June 10, 2006 from http://www.microjava.com/articles/techtalk/mpayment?content_id=3734
- Chan, S. S., Fang, X., Brzezinski, J., Zhou, Y., Xu, S. & Lam, J. (2001). Usability for Mobile Commerce Across Multiple Form Factors. Retrieved June 9, 2006 from www.csulb.edu/web/journals/jecr/issues/20023/paper7.pdf
- Chang K., (1998). Integrated Environment based on Object-Oriented Methodology for Real-time Systems.

- Chun-Wei T., Jiun-Heui H., Ting-Wen L. & Chu-Sing Y. (2005). An intelligent Web portal system for Web information region integration, *IEEE*, vol. 4, pp.3878 – 3883.
- Colafigli, C., P. Inverard, and R. Martriccian, (2001). "InfoParco: An Experience in Designing an Information System Accessible through WEB and WAP Interfaces," Proceedings of the 34th Hawaii International Conference on System Science, Los Alamitos, CA, IEEE Computer Society Press.
- Damij Talib, (2003). Using an Object-Oriented Methodology Called TAD in Business Process Reengineering, in *Journal of Object Technology*, vol. 2, no. 2, March-April 2003, pp. 151-168. http://www.jot.fm/issues/issue_2003_03/article3
- Developershome.com (2005). *XHTML-MP Style Guide*. Retrieved February 12, 2006 from http://developer.openwave.com/dvl/support/documentation/guides_and_references/xhtml.
- El-Sayed M. El-Alfy, (2005). A General Look at Building Applications for Mobile Devices. Retrieved May 26, 2006 from <http://csdl.computer.org/comp/mags/ds/2005/09/o9005.pdf>
- Fengchun Z., Aihua W. & Yanbing J. (2004). A framework to develop a university information portal, *IEEE*, pp. 506 – 509.
- Foo, S. M., Hoover, C. & Lee, W.M. (2001). *Dynamic WAP application development*. Greenwich: Manning Publication Co.
- Gediga, G., Hamborg, K.-C. & Duntsch, I. (2002). Evaluation of Software Systems, in Kent, A., and Williams, J.G., (Ed.) *Encyclopedia of Library and Information Science*, vol. 72. pp. 166-192.

Golier Incorporated. *The New Book of Knowledge*, Dictionary Vol. 2, pp. 1021. Golier: Danbury, Connecticut, 1980.

Greenwood, D. and Calisti, M. (2004). Engineering Web Service – Agent Integration. Whitestein Technology AG, Zurich, Switzerland.

Gsmworld.com (2000). What is WAP? Retrieved June 10, 2006 from <http://www.gsmworld.com/technology/wap/intro.shtml>

Heeseok L., Choongseok L. & Cheonsoo Y. (1998), A Scenario-Based Object-Oriented Methodology for Developing Hypermedia Information Systems, *IEEE*, vol. 2, pp.47-56.

Husin, R., (2004). A comparative Analysis on Methods for Measuring Web Usability: A dissertation Master of Science (Information Technology), Universiti Utara Malaysia.

Kaasinen, Ejia. (2005). User acceptance of mobile services, value, ease of use, trust and ease of adoption. Retrieved May 24, 2006 from <http://www.vtt.fi/inf/pdf/>

Kalkbrenner, G. & Nebojsa, F. (2001). Mobile Services for Campus and Student Needs. Retrieved June 12, 2006 from: <http://ls12.cs.uni-dortmund.de/~kalkbren/campusmobil.pdf>

Kalliola, M. (2005). Mobile payment. Retrieved June 13, 2006 from http://www.tml.hut.fi/Opinnot/T-109.551/2005/reports/Mobile_payments.doc

Ketola, P., Røykkee, M. (2002). The Three Facets of Usability In Mobile Handsets. Retrieved June 13, 2006 from <http://www.id.iit.edu/~id545b/resources/ketola-roykkee.pdf>

- Kothari, C. R. (1985). *Research Methodology, Methods and Techniques*. Delhi: Wiley Eastern Limited.
- Kustin, S. (2002). *The Proliferation of Wireless Internet Access Devices and its Effect on Consumer Behavior Patterns*. Retrieved June 10, 2006 from <http://wwwprogstart.com/techforum/trends4.htm>
- LSDA (2003). *Mobile phones switch young people on to learning*. Retrieved June 14, 2006 from <http://www.lsd.org.uk/files/pdf/press/7feb2003.doc>
- Mcmc.gov (2005). *Facts & Figures, Statistics & Records*. Retrieved May 18, 2006 from http://mcmc.gov.my/facts_figures/stats/index.asp
- Michael S., David Z. & Carolyn W. (2000). *Medical Portals: Web-Based Access to Medical Information*, *IEEE*, pp. 10.
- Nielson, J. (1993). *Usability Engineering*. San Diego, CA: Morgan Kaufmann
- Office of the Government Chief Information Officer, (2005), *An Introduction to Object Oriented Methodology (OOM)*, Retrieved June 20, 2006 from <http://www.ogcio.gov.hk/eng/prodev/download/g52a.pdf>
- Ramsay, M. and Nielsen, J. (2000). *WAP Usability DéjàVu: 1994 All Over Again*. Nielsen Norman Group. <http://www.useit.com/alertbox/20001210.html>
- Nielsen, J. (1994a). *Usability inspection methods*. Proceedings of the SIGCHI conference on Human factors in computing systems, (pp. 413 - 414). New York, NY, USA.
- Sayer, P. (2005). *Mobile phone sales reached new records in first quarter*. Retrieved June

10, 2006 from

<http://www.computerworld.com.my/ShowPage.aspx?agetype=2&articleid=1301&pubid=3&issueid=49>

Seaquest Software, (2002). Web Service Workshop Learn What Web Services Can Do for Your Enterprise, Retrieval September 5, 2006 from
<http://www.seaquest.com/wsworkshop.pdf>

Sharples M., (2000). The Design of Personal Mobile Technologies for Lifelong Learning. *Computers and Education*, 34, 177-193.

The Wap Protocol. (2000). The Wap Protocol. Retrieved June 5, 2006 from
<http://194.51.152.252/WML/wapdocangl.htm>

Tian, M., Voigt, T., Naumowicz, T., Ritter, H., and Schiller, J.: Performance Impact of Web Services on Internet Servers, *International Conference on Parallel and Distributed Computing and Systems (PDCS 2003)*, Marina Del Rey, USA, (Nov. 2003).

Victor M. Gonzalez, "Object-Oriented Methodology for the Analysis and Modelling of Discrete Event Systems. Application to the Generation of the Control Logic based on IEC 61131-3", Ph.D. thesis, University of Oviedo, 2002.

W3C, Web Service Activity, Retrieved November 5, 2006 from
<http://www.w3.org/2002/ws/>

Wap Forum, (2002). What is WAP. Retrieved June 13, 2006 from
<http://www.wapforum.org/faqs/index.htm>.