

**Mobile System for Student Attendance in School (MS-SAS)**

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**A thesis submitted to college Arts & Sciences in partial**

**Fulfillment of the requirement for the degree master**

**(Information Technology)**

**Universiti Utara Malaysia**

**By**

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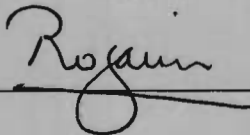
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## ABSTRACT

Mobile technology enables people to access digital information located in the Internet or also beyond the reach of stationary Internet access. The focus of this project is to apply Mobile-application field, particularly in observing students' attendance in schools by instructors and parents of the students, the prospective system will facilitate to teachers to make attendance in the class and save it in the data base of the school ,the head also can add student, and the all of them parents, teachers and head of school can oversee their students during school hours. To achieve this goal, the study will adopt Object oriented development life cycle as a methodology, the four phases will be discussed in section of Research Methodology. Usability testing will be conducted to examine user's satisfaction, lastly to document the models of prototype.

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## CHAPTER ONE

### INTRODUCTION

#### 1.1. Introduction

The last few decades have brought about many transforms in information and communications technology, from the invention of the telephone and transmit technologies to the invention of the personal computer and the internet. These transitions have enabled us to exchange information with other individuals and to fetch data from enormous databases instantly. In the contemporary time, reading emails and sending messages between cell-phones become normal. The next stage for telecom companies and transaction is to allow parents and teachers to enact web services from their mobile devices and possibly, to make these web services runnable on these devices. M-services (Mobile-service) denote this new type of web services. It is believed that one of the most extreme developments of the new millennium is the increased demand for internet access anytime, anywhere, and for anyone Maamar, 2006; Trappey et al (2004).

Maamar (2006) stated two definitions are associated with an M-service; the weak definition is to remotely initialize a web service for execution from a mobile device. In that case, the web service acts as an M-service. The strong definition is to adjust a web service from its hosting site to a mobile device where its execution is arisen.

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## Reference

- Abdul Karim, N., Darus, S., and Hussin, R (2006). Mobile phone applications in academic library services: a students' feedback survey, *Campus-Wide Information Systems*, 23 (1), 35-51.
- Alan, D., Wixom, B. H., Tegarden, D. (2005). *Systems analysis and design with UML version 2.0: an object-oriented approach*. Hoboken, USA: John Wiley & Sons.
- Arrington, C. T. (2001). Enterprise java with UML. USA, John Wiley & sons, pp.44
- Arrington, C. T. & Rayhan, S. H. (2003). Enterprise java with UML. Indiana, USA: Joe Wikert.
- Bentley, S. (2007). Design of Mobile Services Supporting Knowledge Processes on Building Sites. *Digital Object Identifier*, 1, 10-10.
- Brown, D. W. (2002). *An introduction to object-oriented analysis objects and UML in plain English*. New York: John Wiley & sons.
- Chen, C., Kuo, S. and Chen, C-Yu (2008). The Development and Application of a Mobile Learning System for Carrying out Elementary School Social Class Activities An Example of Pingtung Matzu Culture, *Digital Object Identifier*, 860 – 863.
- Connolly, C. (2007). Wildlife-spotting robots. *Sensor Review*, 27(4), 282-287.
- Corbett, S. (2008), Can the cellphone help end global poverty?, *New York Times*, 26 April, available at: [www.nytimes.com/2008/04/13/magazine/13anthropology-t.html](http://www.nytimes.com/2008/04/13/magazine/13anthropology-t.html).
- Edwards, P. (1993). System analysis and design. Watsonville, USA: McGraw-Hill.
- Fitch C.J., Adams, C. (2006). Managing mobile provision for community healthcare support: issues and challenges. *Business Process Management Journal*, 12(3), 299-310.
- Frey, K. S. (2005). Gathering and communicating information about school bullying. *Health Education*, 105(6), 409-413.
- George, J.F., Batra, D., Valacich, J. S., Hoffer, J. A. (2004). *Object-Oriented systems analysis and design*. New Jersey: Pearson Education.
- Hahn, J (2008). Mobile Learning for the Twenty-first Century Librarian, *Reference Services Review*, 36 (3), 272 – 288.
- Hart, J., Hannan, M. (2004). The future of mobile technology and mobile wireless computing. *Campus-Wide Information Systems*, 21(5), 201-204.

Herzog, O. and et al (2007). The future of Mobile Computing & D activities in the state of Bremen Internet Research, *Center for Computing Technologies and Mobile Research Center*, 17 (5), 495-504.

Hoffer, J. A., George, J. F., & Valacich, J. S. (2002). *Modern systems analysis and Design*. New Jersey: Pearson Education.

Horrigan, J. (2008a), Mobile Access to Data and Information, *Pew Internet and American Life Project*, available at: [www.pewinternet.org/pdfs/PIP\\_Mobile.Data.Access.pdf](http://www.pewinternet.org/pdfs/PIP_Mobile.Data.Access.pdf).

Horrigan, J. (2008b), Seeding the Cloud: What Mobile Access Means for Usage Patterns and Online Content, *Pew Internet and American Life Project*, available at: [www.pewinternet.org/pdfs/PIP\\_Users.and.Cloud.pdf](http://www.pewinternet.org/pdfs/PIP_Users.and.Cloud.pdf).

James, J., Choi, F., Yu, G. (2000). The Application-Specific Virtual Meeting Place: Tools for Virtual Communication by Students and Teachers. , *Mathematics & Technology Education*, 157-161.

Kasiwagi, H., Ohtsuki, K., Morishita, J., Kaburagi, M., Kitamura, S. (2000). Coordination of the Mailing List for Cooperative/Spontaneous Learning. *Mathematics & Technology Education*, 173-184

Kenneth, E. K., Julie E. K., (2008). *System analysis and Design*. New Jersey: pearson Education.

Khenak, F. (1999) Teching using intermedia: towards a poket school. *Engineering Science and Education Journal*, 8(3), 119 – 123.

Kifer, M., Bernstein, A., Lewis, P. M. (2006). *Database systems an application-oriented approach*. Boston: pearson Education.

Kratcoski, P. C., Das, D. K. (2002). Traffic policing: an international perspective. *Policing: An International Journal of Police Strategies & Management*, 25(3), 619-630.

Kukulska-Hulme, A. (2007), Mobile usability in educational contexts: what have we learnt? , *The International Review of Research in Open and Distance Learning*, 8 (2), available: [www.irrodl.org/index.php/irrodl/article/view/356/879](http://www.irrodl.org/index.php/irrodl/article/view/356/879).

Maamar, M. (2006). A mobile application based on software agents and mobile web services. *Business Process Management Journal*, 13(3), 311-329.

Man, M., Yazid, M., Aezwani, W. (2007). Tracking Student's Class Attendance Using Wireless PDA :: SmartChecker. 4. march, 13, 2007, from: <http://www.digitalllearning.in/articles/article-details.asp?articleid=1080&typ=REGULAR%20FEATURES>.

Marakas, G. M. (2001). *System analysis and design: an active approach*. New Jersey: Pertice Hall.

Malcolm, H., Wilson, V., Davidson, J. and Kirk, S. (2003), *Absence from School: A Study of Its Causes and Effects in Seven LEAs, Research Report 424*, DfES Publications, Nottingham.

McElligott, T. (2006). Mobile phone: safety device or distraction?. *ABI/Inform Global*, 247(17), 18.

McNeal, R.B. (1999). Parental involvement as social capital: differential effectiveness on science achievement, truancy and dropping out, *Social Forces*, 78 (1), 117-44.

Mowlds, F., Roche, B. J., Mangina, E. (2005). ABITS: learning more about students through intelligent educational software. *Campus-Wide Information Systems*, 22(3), 131-139.

Muyinda, P. B. (2007). MLearning: pedagogical, technical and organisational hypes and realities. *Campus-Wide Information Systems*, 24(2), 97-104.

Ngware, M., Onsomu, E., Muthaka, D., and Manda, D (2006). Improving access to secondary education in Kenya: what can be done, *Equal Opportunities International*, 25 (7), 523-543

Norbayah M. S., & Norazah, M. S. (2007). Mobile phone usage for m-learning: comparing heavy and light mobile phone users. *Campus-Wide Information Systems*, 24, 355-365.

Smith, P. A., Birney, L. L. (2006). The organizational trust of elementary schools and dimensions of student bullying. *International Journal of Educational Management*, 19(6), pp. 469-485.

Shibata, H. (2005). Communications, Computers and signal Processing. *Digital Object Identifier*, 590 – 592.

Shibata, H., Kasiwagi, Y., Motomura, Y., Ohtsuki, K. (2002). A learning Model of Computer Science Education for Liberal Arts Students. *Frontiers in Education*, f3g-2 - f3g-7.

Shih, Y. and Mills, M. (2007), Setting the new standard with mobile computing in online learning, *The International Review of Research in Open and Distance Learning*, 8 (2), available at: [www.irrodl.org/index.php/irrodl/article/view/361/872](http://www.irrodl.org/index.php/irrodl/article/view/361/872).

Steenderen, M.V. (2002), Business application of WAP, *The Electronic Library*, 20 (3), 215-23.



Reid, K. (2002), *Truancy: Short and Long-Term Solutions*, Routledge Falmer, London

Reid, K. (2003). Strategic approaches to tackling school absenteeism and truancy: the TrafficLights (TL) scheme, *Educational Review*, 55 (3), 305-21.

Reid, K. (2006). Raising school attendance: a case study of good practice in Monitoring and raising standards. *Quality Assurance in Education*; 14(3), 199-216.

Ron, S. (1989). Tracking Trucks By SatelliteHigh. *Technology Business*, 9(5), 24.

Trappey, A. J. A., Trappey, C. V., Hou, J. L., Bird J.G. (2004). Mobile agent technology and application for online global logistic services. *Industrial Management & Data Systems*, 104(2), 169-183

Whitten, J. L., Bentley, L. B. (2008). *Introduction to systems analysis and design*. New York: McGray-Hill Companies. Woollatt, C. (1996) Managing Safely. *Industrial Management & Data Systems*, 96(6), 20-22.

Witten J. L., Bentley L. B. (2007). *System analysis and design methods*. New York: McGraw-Hill.

Zhang, M. (2003). Links between school absenteeism and child poverty, *Pastoral, Care in Education*, 21 (1), 10-17.

Zhang, M. (2004). Time to change the truancy laws? Compulsory education: its origin and modern dilemma, *Pastoral Care in Education*, 22 (2), 27-33.