

**Requirement Model For Learning Management System  
In DELL**

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

by  
Lau Kee Hoe

Copyright © Lau Kee Hoe, 2004. All rights reserved.



**JABATAN HAL EHWAL AKADEMIK**  
**(Department of Academic Affairs)**  
**Universiti Utara Malaysia**

**PERAKUAN KERJA KERTAS PROJEK**  
**(Certificate of Project Paper)**

Saya, yang bertandatangan, memperakukan bahawa  
*(I, the undersigned, certify that)*

**LAU KEE HOE**

calon untuk Ijazah  
*(candidate for the degree of)* **MSc. (INFORMATION TECHNOLOGY)**

telah mengemukakan kertas projek yang bertajuk  
*(has presented his/her project paper of the following title)*


**REQUIREMENT MODEL FOR LEARNING MANAGEMENT SYSTEM**  
**IN DELL**

seperti yang tercatat di muka surat tajuk dan kulit kertas projek  
*(as it appears on the title page and front cover of project paper)*

bahawa kertas projek tersebut boleh diterima dari segi bentuk serta kandungan  
dan meliputi bidang ilmu dengan memuaskan.  
*(that the project paper acceptable in form and content, and that a satisfactory  
knowledge of the filed is covered by the project paper).*

Nama Penyelia Utama  
*(Name of Main Supervisor):* **MRS. ALAWIYAH ABD. WAHAB**

Tandatangan  
*(Signature)*

:   
\_\_\_\_\_

Tarikh  
*(Date)*

: 15 Jun 2004

## **PERMISSION TO USE**

In presenting this thesis, the author agrees that Universiti Utara Malaysia's library may make this thesis freely available for reference and inspection. The author further agrees that permission for photocopying of this thesis in any manner, in whole or in part, for scholarly purposes may be granted by the author's supervisor or, in her absence, by the Dean of the Faculty of Information Technology. It is understood that any photocopying, publication or use of this thesis, or parts thereof for financial gain shall not be allowed without the author's written permission. It is also understood that, due recognition shall be given to the author and Universiti Utara Malaysia for any scholarly use of the materials presented in this thesis.

Permission for photocopying or other use of materials in this thesis, in whole or in part, should be addressed to:

Dean of Faculty of Information Technology

Universiti Utara Malaysia

06010 UUM Sintok

Kedah Darul Aman

## ABSTRAK

Project ini bertujuan untuk membina satu model keperluan untuk sistem pengurusan latihan secara langsung di Dell Asia Pacific. Metodologi yang digunakan untuk membina model ini merangkumi lima fasa iaitu fasa pengajian awal dan pengurusan, fasa penganalisan, fasa rekabentuk, fasa pembangunan dan fasa pemeriksaan/penilaian sistem. Pendekatan *object oriented* dan teknik *Unified Modeling Language(UML)* digunakan dalam pembinaan model ini. Model keperluan ini mengandungi *use case diagram*, *use case specification*, *class diagram*, *sequence diagram*, *collaboration diagram*, *state/activity diagram*, *deployment diagram* dan teks informasi sokongan. Pemeriksaan dan penilaian telah dijalankan bagi menganalisa capaian web. Sepuluh pekerja syarikat dari bahagian latihan telah dipilih untuk menilai sistem ini. Secara keseluruhan, keputusan yang diperolehi menunjukkan bahawa model ini memenuhi keperluan dalam segi pengurusan latihan khas untuk syarikat.

## ABSTRACT

This project aims to create a requirement model of learning management system (LMS) that enables online learning management in Dell Asia Pacific. Project methodology would use the systems development lifecycle, which consists of initial study or planning phase, system analysis phase, system design phase, development phase and testing/evaluation phase. The system was developed using object-oriented approach, which used Unified Modeling Language (UML) as a modeling tool. The requirement model consists of use case diagram, use case specification, class diagram, sequence diagram, collaboration diagram, state/activity diagram, deployment diagram and supporting textual information. Test and evaluation has been conducted to test and validate interfaces satisfaction of the requirement model. Ten users from company's training department have been selected to participate in the test and evaluation phase. Overall evaluation results show that this requirement model meets the learning management in term of company perspectives.

## ACKNOWLEDGEMENTS

I would like to give thanks to my supervisor, Puan Alawiyah Abd. Wahab for her continued supervision, knowledge sharing and helps throughout my project.

My deepest thanks go to my wife and my son for their love, support and understanding.

I am also grateful to Dell Asia Pacific's staff for their advice as to how to improve my requirement model as well as to all my fellow friends who have unselfishly shared their knowledge with me that has motivated me to complete this thesis.

Finally, I want to thank to all who lend a kindly hand in materializing this project.

## TABLE OF CONTENTS

	<b>Page</b>
PERMISSION TO USE	i
ABSTRACT (BAHASA MALAYSIA)	ii
ABSTRACT (ENGLISH)	iii
ACKNOWLEDGEMENTS	iv
TABLE OF CONTENTS	v
LIST OF TABLES	viii
LIST OF FIGURES	ix
LIST OF ABBREVIATIONS	x
LIST OF APPENDICES	xi
CHAPTER ONE: INTRODUCTION	
1.1 Statement of Problem	2
1.2 Objective and Scope of Project	3
1.3 Significance of Study	3
1.4 Software and Hardware Requirements	4
CHAPTER TWO: LITERATURE REVIEW	
2.1 Why Used Web-Base Learning Tools	5
2.2 Growth Potential	6
2.3 Categorization of Web-Base Learning	8

2.4	General Attributes of Web-Based Learning Tools	9
-----	--	---

### CHAPTER THREE: PROJECT METHODOLOGY

3.1	Initial Study/Planning Phase	13
3.2	System Analysis Phase	13
3.3	System Design Phase	14
3.3.1	Input/Output Design	14
3.3.2	Interface Design	15
3.3.3	Data Model	15
3.3.4	Data Dictionary	16
3.3.5	Normalization	22
3.3.5.1	Normalization of TEST table	23
3.3.5.2	Normalization of COURSE INFORMATION table	24
3.3.6	Table Relationship Diagram	26
3.4	Development Phase	27
3.5	Testing and Evaluation Phase	27

### CHAPTER FOUR: RESEARCH FINDING

4.1	Use Case Diagram	31
4.2	Use Case Specification	33
4.3	Class Diagram	33
4.4	Sequence Diagram	34
4.5	Collaboration Diagram	35



4.6	State Diagram	35
4.7	Activity Diagram	35
4.8	Deployment Diagram	36

#### CHAPTER FIVE: CONCLUSION

5.1	Project's Summary	37
5.2	Problem and Limitation	38
5.3	Recommendation for Future Project	38
5.4	Conclusion	39

	REFERENCES	40
--	------------	----

	LIST OF APPENDICES	42
--	--------------------	----

## LIST OF TABLES

<b>Table No.</b>	<b>Title</b>	<b>Page No</b>
2.1	Attributes of LMS	11
3.1	Relation Name: User	16
3.2	Relation Name: Student_Evaluation	18
3.3	Relation Name: Course_Schedule	18
3.4	Relation Name: Course_Registration	19
3.5	Relation Name: Course_Upload	19
3.6	Relation Name: Test_QA	20
3.7	Relation Name: Student_Test_Results	20
3.8	Relation Name: Student_Attendance	21
3.9	Relation Name: Evaluation_Form	22
3.10	Relation Name: Department_ref	22
3.11	Relation Name: Student_Answer	22
3.12	Primary and Foreign Key mapping to tables	27
3.13	Test score for user response on interfaces satisfaction	28

## LIST OF FIGURES

<b>Figure No.</b>	<b>Title</b>	<b>Page No</b>
3.1	LMS Project Methodology	12
3.2	Table relationship diagram of LMS	26
4.1	Use Case Diagram For LMS	32
4.2	Class Diagram For LMS	34

## LIST OF ABBREVIATIONS

<b>1NF</b>	First Normal Form
<b>2NF</b>	Second Normal Form
<b>3NF</b>	Third Normal Form
<b>ASP</b>	Active Server Page
<b>BCNF</b>	Boyce-Codd Normal Form
<b>CBT</b>	Computer Based Training
<b>CMS</b>	Course Management System
<b>HAT</b>	HOORA Analysis Tool
<b>HTML</b>	Hypertext Markup Language
<b>LMS</b>	Learning Management System
<b>ODBC</b>	Open Database Connectivity
<b>SQL</b>	Structure Query Language
<b>UML</b>	Unified Modeling Language

## LIST OF APPENDICES

<b>Appendix</b>	<b>Title</b>	<b>Page No</b>
A	Use Case Specification	42
B	Sequence Diagram	59
C	Collaboration Diagram	68
D	State Diagram	77
E	Activity Diagram	86
F	Deployment Diagram	102
G	Example of Prototype	104
H	Example of Test Plan and Questionnaires	128

# CHAPTER ONE

## INTRODUCTION

PC Computing survey found that more than half of the white-collar workers surveyed reported that they do not have the technical skills required to do their jobs. Most smart employees will eventually develop the skills needed to perform their job through trial and error. This however would affect the company productivity. It has been reported in the PC Magazine that training raises productivity by as much as 35% or 200 hours per employee each year or more than twenty thousand ringgit per headcount for an average executive (Grech, 1999).

Nowadays, electronic learning is a chance to reinvent the role of training in the organization and it is discussed in the same breath with electronic business and electronic commerce (Werner, 2004). Most companies have their own training development programs, which includes hands on classroom or on the job training, technical sheets, self-study procedures and computer based trainings (CBT). CBT is one of the more popular methods used by companies to train their employees as it is affordable, increases ability to train employees at remote locations, available 24 hours a day allowing employees to learn at their own pace and free time, easier and faster to deploy training of new products and reduces company training cost. There are many companies offering such computer-based tools also known as electronic learning tools or Learning Management Systems (LMS). Each product is customizable depending on the customer environment and requirements

The contents of  
the thesis is for  
internal user  
only

## REFERENCES

- Bennett, F. (1999). *Computers as tutors: Solving the crises in education*. Faben, Inc. Retrieve from <http://www.cris.com/~faben1/fullbook.dhtml>
- Bennett, S., McRobb, S., & Farmer, R. (2002). *Object-oriented system analysis and design using UML*. Glasgow: McGraw Hill.
- Beshears, F.M. (2000, November). *Web-based Learning Management Systems*. Webnet Seminar Note. Retrieve from [http://socrates.berkeley.edu/~fmb/articles/web\\_based\\_lms.html](http://socrates.berkeley.edu/~fmb/articles/web_based_lms.html).
- Boggs, W., and Boggs, M. (1999) *Mastering UML with Rational Rose*. San Francisco: SYBEX Inc.
- Boulton, P.(2000). *Current State of e-Learning from an Academic Perspective*. Brandon-hall.com. Retrieve from [http://www.brandonhall.com/public/pdfs/monash\\_survey.pdf](http://www.brandonhall.com/public/pdfs/monash_survey.pdf)
- Broadbent, B. (2001, December). *Selecting a Learning Management System*. The Training Report. Retrieve from <http://www.trainingreport.ca/articles/story.cfm?StoryID=204>
- Chin, J.P., Diehl, V.A., Norman, K.L. (1988). *Development of an Instrument Measuring User Satisfaction of the Human-Computer Interface*. ACM CHI'88 Proceedings, 213-218. Retrieve from <http://www.acm.org/~perlman/question.cgi>
- Erik, P.W.M., & Veenandal, V. (1988, November). *Questionnaire Based Usability Testing 1988*. European Software Quality Week, Brussels.
- Grech, W.C.(1999, December). *Your Employees Are Clueless*. PC Computing Magazine. Retrieve from <http://www.ekho.com/CLUELESS.html>
- Hall, B. (2000). *E-Learning Market Guide*. Brandon-hall.com. Retrieve from <http://www.brandonhall.com/public/marketguide/marketguide-062101.pdf>
- Hall, B. (2001). *Is the Holy Grail of Integration Close at Hand?*. Learning Management and Knowledge Management. Retrieve from [http://www.brandonhall.com/public/whitepapers/lmkm/whitepaper\\_lmkm260101.PDF](http://www.brandonhall.com/public/whitepapers/lmkm/whitepaper_lmkm260101.PDF).
- Hall, B. (2003). *Six Steps To Implementing E-Learning*. E-Learning Guidebook. Retrieve from <http://www.brandonhall.com/public/pdfs/sixstepguidebook.pdf>
- Hall, B. *Learning Management Systems and Learning Content Management Systems Demystified*. Brandon-hall.com. Retrieve from [http://www.brandonhall.com/public/resources/lms\\_lcms/](http://www.brandonhall.com/public/resources/lms_lcms/).



NATO Training Group (1999, April), *Functional Requirements For A Learning Management System*. Retrieve from <http://www.judybrown.com/judy/Old/DOD-NATO.htm>

Priestley, M. (2000). *Practical object-oriented design with UML*. Berkshire: McGraw-Hill Publishing Company.

Rosenberg, D. & Scott, K. (2001). *Applying use case driven object modeling with UML: an annotated e-commerce example*. New Jersey: Addison-Wesley.

Werner, T. (2004). *To Successfully Implement E-learning, Forget What You Know About Change*. Change Management and E-Learning. Retrieve from <http://www.brandon-hall.com/whitpaponcha.html>

Yung, J. (2000, April). *Research On Online Learning Grows*. BAOL 'Open Learning Days', Issues 52. Retrieve from <http://www.baol.co.uk/PDF/OLT/Issue%2052/research.pdf>