

The copyright © of this thesis belongs to its rightful author and/or other copyright owner. Copies can be accessed and downloaded for non-commercial or learning purposes without any charge and permission. The thesis cannot be reproduced or quoted as a whole without the permission from its rightful owner. No alteration or changes in format is allowed without permission from its rightful owner.



**EMBEDDED SCHEME OF WORK STRUCTURE INTO LEARNING  
MANAGEMENT SYSTEM**



**NIK NURUL HAFZAN BINTI MAT YAACOB**

**UUM**  
Universiti Utara Malaysia

**MASTER OF SCIENCE (INFORMATION TECHNOLOGY)  
UNIVERSITI UTARA MALAYSIA  
2016**

## **Permission to Use**

In presenting this thesis in fulfilment of the requirements for a postgraduate degree from Universiti Utara Malaysia, I agree that the Universiti Library may make it freely available for inspection. I further agree that permission for the copying of this thesis in any manner, in whole or in part, for scholarly purpose may be granted by my supervisor(s) or, in their absence, by the Dean of Awang Had Salleh Graduate School of Arts and Sciences. It is understood that any copying or publication or use of this thesis or parts thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to Universiti Utara Malaysia for any scholarly use which may be made of any material from my thesis.

Requests for permission to copy or to make other use of materials in this thesis, in whole or in part should be addressed to:

Dean of Awang Had Salleh Graduate School of Arts and Sciences

UUM College of Arts and Sciences

Universiti Utara Malaysia

06010 UUM Sintok

## Abstrak

Kajian ini berkaitan dengan integrasi automatik Rancangan Pengajaran (TP) atau Skema Rancangan Mengajar (SRM) ke dalam Moodle; perisian pengurusan kursus popular (CMS). SRM adalah dokumen yang disediakan oleh guru-guru akademik untuk memperincikan pelan kursus sepanjang tempoh pengajaran. Ia membantu untuk menguruskan aktiviti-aktiviti pelajar seperti kuiz, peperiksaan, topik, dan lain-lain untuk menjadikan ia lebih tersusun. Walaubagaimanapun, kebanyakan jabatan-jabatan seperti Pusat Pengajian Pengkomputeran (SOC) biasanya menyediakan dokumen secara manual. Moodle membolehkan kursus akan diuruskan dengan berkesan walaupun penggunaan perkhidmatan web. Terdapat beratus-ratus ciri yang disediakan oleh Moodle untuk membantu dalam pengajaran. Moodle membahagikan tempoh mengajar mengikut tarikh pra-set. Buat masa sekarang, SOW perlu ditambah secara manual ke dalam seksyen SOW di Moodle. Kajian ini mendapati bahawa kebanyakan dokumen-dokumen dalam SOW pensyarah tidak sama dengan kandungan Moodle mereka dan dengan itu mereka perlu mengubah suai dengan sewajarnya. Ini adalah disebabkan oleh kemasukan manual untuk SOW dalam sistem Moodle yang mengambil masa dan agak rumit. Kajian ini membentangkan penyelesaian yang berpotensi dalam struktur SOW yang boleh disepadukan secara automatik mengikut aktiviti mingguan, seperti tugas dan kuiz melalui penggunaan plugin yang dibangunkan dalam kajian ini. Kaedah yang digunakan dalam kajian ini terdiri daripada lima langkah, iaitu kesedaran tentang masalah, cadangan, pembangunan, penilaian dan kesimpulan. Berdasarkan penilaian yang dijalankan melalui persampelan, plugin yang dibangunkan melalui kajian ini mempunyai nilai yang signifikan dengan menjimatkan masa berharga dalam membantu tugas ahli akademik mengemaskini dan menggunakan Moodle, khususnya yang berkaitan dengan SOW.

**Kata kunci:** Sistem Pengurusan Pembelajaran (LMS), tertanam, Skim Work (SOW), Moodle, Perisian Pengurusan Kursus (CMS)

## Abstract

This research is related to the automatic integration of the Teaching Plan (TP) or Scheme of Work (SOW) into Moodle; a popular course management software (CMS). SOW is a document prepared by academic teachers to detail out a plan of the course throughout the teaching duration. It helps to better manage student activities such as quizzes, exam, topics, and etc. However, most departments like the School of Computing (SOC) normally prepare the document manually. Moodle allows for course to be managed effectively though the use of a web service. There are hundreds of features provided by Moodle to assist in teaching. Moodle divides the teaching duration according to pre-set dates. Current Moodle practice is that the SOW needs to be added manually into the SOW section of Moodle. This study found that most of the time, the lecturers' SOW documents are not the same with their Moodle content and thus would have to modify accordingly. This is due to the manual entry for the SOW in the Moodle system that takes time and becomes cumbersome. This study presents a potential solution and describe show the SOW structure can be integrated automatically according to the weekly activities, like assignments and quizzes, by using a plugin developed in this study. The methodology used in this study is made up of five steps, namely, the awareness of the problem, suggestion, development, evaluation, and conclusion. Based on the evaluation performed through sampling, the plugin developed through this study has significant value by saving precious time in assisting the academician's task of updating and using Moodle, specifically related to the SOW.

**Keywords:** Learning Management System (LMS), embedded, Scheme of Work (SOW), Moodle, Course Management Software (CMS)

## **Acknowledgement**

*In The Name of Allah, The Most Gracious and The Most Merciful, and Him Alone  
worthy of all praise*

Alhamdulillah, I finished my thesis for master degree.

First and foremost, I am expressing my thankfulness and praise to Allah S.W.T for His guidance and blessings, thus I can complete my report project course to fill my Master of Science (Information Technology) certificate rules.

I would like to thank my supervisor, Dr. Amran bin Ahmad, for the valuable advice, patience, inspiration and support he has given me in the writing of this report. In addition, I would like to acknowledge my master project coordinator, Dr. Norliza binti Katuk for her guidance and mentoring.

My deepest thanks go to all my family especially my mom, Pn. Hjh Tuan Som binti Tuan Dir and my dad, Hj. Mat Yaacob bin Awang Mat for their love, understanding and support me in financial.

I also would like to thank to my colleagues and friends. This is because they have helped me so much during my project. They are very nice and friendly. They consistently offer help and suggestions when I doing my practical project. Besides, they also always share their working experience and other information with me.

Last but not least, a great deal of appreciations goes to all people who contribute directly or indirectly in completing this project successfully. Thank you.

## Table of Contents

Permission to use .....	ii
Abstrak .....	iii
Abstract .....	iv
Acknowledgement .....	v
Table of contents .....	vi
List of table .....	viii
List of figures.....	ix
List of Appendices .....	xi
List of Abbreviations .....	xii
<b>CHAPTER ONE INTRODUCTION.....</b>	<b>1</b>
1.1 Background .....	1
1.2 Problem Statement .....	2
1.3 Research Questions .....	5
1.4 Research Objectives .....	5
1.5 Significant of Research .....	6
1.6 Outcome Contributions .....	7
1.7 Scope of the Research .....	9
<b>CHAPTER TWO LITERATURE REVIEW .....</b>	<b>10</b>
2.1 Introduction .....	10
2.2 E-Learning .....	10
2.2.1 Characteristics of E-Learning .....	13
2.2.2 Types of E-Learning Software .....	14
2.3 Moodle .....	16
2.4 Status Implementation of e-Learning in Malaysian Institutions of Higher Learning .....	16
2.4.1 Malaysian Universities with E-Learning Implementation .....	16
2.4.2 E-learning Implementation Overseas .....	18
2.5 UUM Online Learning .....	19
2.5.1 Logging into UUM Online Learning .....	20

2.6	Moodle embedded plug-in .....	22
2.7	Scheme of Work .....	24
2.8	SOW implementation in LMS .....	27
2.9	Summary .....	28
<b>CHAPTER THREE METHODOLOGY .....</b>		<b>30</b>
3.1	Introduction .....	30
3.2	Research Design .....	30
3.3	Awareness of Problem .....	31
3.4	Suggestion .....	32
3.5	Development .....	32
	3.5.1 System Management .....	33
	3.5.2 Requirement .....	35
	3.5.3 Hardware .....	35
	3.5.4 Software .....	35
	3.5.5 Browser Support .....	36
	3.5.6 Coding .....	37
3.6	Scheme of Work Structure .....	37
3.7	Embedding Mechanism .....	38
3.8	Implementation .....	39
3.9	Moodle Configuration .....	47
3.10	Evaluation .....	51
3.11	Summary .....	52
<b>CHAPTER FOUR EVALUATION OF EMBEDDING STRUCTURE .....</b>		<b>53</b>
4.1	Introduction .....	53
4.2	UML Diagram .....	53
	4.2.1 Use Case Diagram .....	54
	4.2.2 Sequence Diagram .....	55
4.3	Testing .....	55
4.4	Analysis .....	59
	4.4.1 Findings .....	60



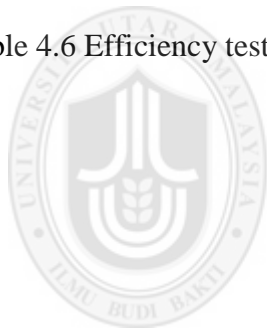
4.5	Bar Chart .....	64
4.6	Summary .....	65
<b>CHAPTER 5 DISCUSSION OF RESULTS AND CONCLUSION.....</b>		<b>66</b>
5.1	Introduction .....	66
5.2	Process Embedding Scheme of Work .....	66
5.3	Problem .....	68
5.4	Discussion .....	68
	5.4.1 SOW Structure .....	69
5.5	Research Constraints .....	69
5.6	Further Recommended Research .....	70
5.7	Conclusion .....	70
<b>REFERENCES .....</b>		<b>72</b>
<b>APPENDICES .....</b>		<b>76</b>



**UUM**  
 Universiti Utara Malaysia

## List of Tables

Table 2.1 Comparison between LMS (Kumar et al., 2011) .....	14
Table 3.1 Recommended Hardware Space (www.moodle.org) .....	35
Table 3.2 Recommended Software (www.moodle.org) .....	35
Table 3.3 Browser Support (www.moodle.org) .....	36
Table 4.1 Usability testing .....	60
Table 4.2 Functionality testing .....	60
Table 4.3 Reliability testing .....	61
Table 4.4 Maintainability testing .....	62
Table 4.5 Adaptability testing .....	62
Table 4.6 Efficiency testing .....	63



**UUM**  
Universiti Utara Malaysia

## List of Figures

Figure 1.1 : UUM Online Learning System .....	4
Figure 2.1 : Peer reviewed articles by faction of the human resources for health workforce .....	12
Figure 2.2 : Architecture of a sharable e-learning based on cloud computing .....	13
Figure 2.3 : Resources and activities interface in Moodle .....	18
Figure 2.4 : Logging into UUM Online Learning .....	20
Figure 2.5 : Logged in screen .....	20
Figure 2.6 : Registered courses .....	21
Figure 2.7 : Teaching plan .....	21
Figure 2.8 : General discussion .....	22
Figure 2.9 : Moodle plug-in list .....	23
Figure 2.10 : Lamp stack .....	24
Figure 2.11 : Example of a Scheme of Work .....	25
Figure 2.12 : Teaching plan for literacy subject .....	26
Figure 2.13 : Literacy minutes manager .....	27
Figure 3.1 : The general methodology of the design science research .....	31
Figure 3.2 : Navigation block .....	33
Figure 3.3 : Administration block .....	34
Figure 3.4 : Teaching plan structure example .....	37
Figure 3.5 : Embedding mechanism process .....	38
Figure 3.6 : Main page of Wampp setup wizard .....	40
Figure 3.7: Accepting the agreement and clicking <i>Next</i> .....	40
Figure 3.8 : Wampp setup wizard:Selecting installation folder .....	41
Figure 3.9 : Select additional tasks .....	42
Figure 3.10 : Ready to install .....	42
Figure 3.11 : Wampp setup wizard beginning to install .....	43
Figure 3.12 : Installing the Wampp server .....	44
Figure 3.13 : PHP mail parameters .....	45
Figure 3.14 : Completing the Wampp server setup wizard .....	46
Figure 3.15 : Start all services .....	47
Figure 3.16 : Admin log in form .....	48
Figure 3.17 : Main page of Moodle .....	48

Figure 3.19 : Select course .....	49
Figure 3.20 : Select course “Network” .....	49
Figure 3.21 : Weekly format .....	50
Figure 3.22 : Refresh Moodle site .....	50
Figure 3.23 : Result appears .....	51
Figure 4.1 : Use Case Diagram .....	54
Figure 4.2 : Sequence Diagram .....	55
Figure 4.3: Select “Network” .....	56
Figure 4.4 : Go to link : <a href="http://localhost/testupload/upload.html">http://localhost/testupload/upload.html</a> .....	56
Figure 4.5 : Choose “realsow” file .....	57
Figure 4.6 : Choose the data .....	58
Figure 4.7: Refresh link: <a href="http://localhost/moodle/course/view.php?id=2">http://localhost/moodle/course/view.php?id=2</a> .....	58
Figure 4.8 : Refresh link .....	59
Figure 5.1 : Embedding SOW Flow .....	67
Figure 5.2 : Embedding Mechanism .....	68



## List of Appendices

Appendix A Coding .....	76
Appendix B Steps on how to launch the server .....	80
Appendix C Evaluation .....	85



## **List of Abbreviations**

UUM : Universiti Utara Malaysia

ICT : Information Communication Technologies

LMS : Learning Management System

VLM : Virtual Learning Management

OUM : UUM Online Learning

SOW : Scheme of work

MQA : Malaysian Quality Agency

LCMS : Learning Content Management System

WWW : World Wide Web

CMS : Course Management System

OSS : Open Source Software

VLE : Virtual Learning Environment

MMLS : Multimedia Learning System

OUM : Open University Malaysia

# CHAPTER ONE

## INTRODUCTION

### 1.1 Background

The Malaysian Quality Agency (MQA) has its own standardised of Scheme of Work (SOW), so academic staff like lecturers in any university in Malaysia, like Universiti Utara Malaysia (UUM), must follow the rules from the MQA because SOW is one of the MQA mandatory requirements. Currently, UUM Online Learning (UOL) has been developed as a medium or interface for linking the lecturer and their students via the Internet. In UOL, course notes and related media are uploaded into the system by the lecturer for the students to use. Assessments, such as quizzes and assignments can also be uploaded and run at predetermined times. SOW is a very important document used by lecturers in UUM because it assists in informing the lecturers as well as students alike about the upcoming events of the course, since it is the blueprint for the course. In the area of academic field, SOW is more important for the lecturers because SOW serves as a guideline or reference for the lecturers to be prepared with the materials and assessments in advance, well before the course commences. However, the UUM implementation of SOW is still in the manual form, where the lecturer manually types the information into a document or a form and printed on the paper before the start of every semester. In order to move towards a paperless environment, this manual operation of SOW implementation can potentially be computerised to save time and money.

According to Blanco and Ginovart (2010), there are so many alternative ways to reduce using paper in the academic field, like using Moodle. According to Jonathan

The contents of  
the thesis is for  
internal user  
only



## REFERENCES

- Alian, M., AL-Akhras, M. (2010). *AdaLearn: An Adaptive E-Learning Environment*. ISWSA'10, June 14–16, Amman, Jordan. ACM.
- Blanco, M., Ginovart, M. (2010). *Creating Moodle Quizzes for the Subjects of Mathematics and Statistics Corresponding to the First Years in Engineering Studies*. Universitat Politècnica de Catalunya, Spain.
- Bar, H., Haussge, G., Roßling, G. (2007). *An Integrated System for Interaction Support in Lectures*. ITiCSE'07, June 23–27, Dundee, Scotland, United Kingdom. ACM.
- Botturi, L. (2003). *Instructional Design & Learning Technology Standard*. ICeF Quaderni dell'Istituto, 9.
- Brandl, K. (2005). *Are you Ready to "Moodle"?*. Language Learning/Technology, Washington. Vol. 9 (2), pp:16-23.
- BusinessDictionary.com,. *6 Tips For Developing A Prototype*. N.p., 2015. Web. 26 Oct. 2015.
- Cerbo, F. D, Doderò, G., Succi, G. (2008). *Extending Moodle For Collaborative Learning*. ITiCSE'08, June 30–July 2, Madrid, Spain. ACM.
- Chee, H. M., Onn, C. W., Hwa, S. P. (n.d.). *Implementation of LMS among Private Higher Learning Institutions in Malaysia*. Universiti Tunku Abdul Rahman (UTAR).
- Conner, C. (2013). *Method for recommending a teaching plan in literacy education*. U.S Patent.
- D.Jonathan (2011). *Using Moodle To Enhance Online Classrooms And Professional Development*. 8.4 : 41. Print.
- Dumas, S. Joseph, and R. Janice. (1993). *A Practical Guide to Usability Testing*. Norwood, N.J. : Ablex Pub. Corp.,Print

Ellis, R. K. (2009). *Field Guide to Learning Management Systems*. American Society for Training & Development. Retrieved from [http://webcache.googleusercontent.com/search?q=cache:http://cgit.nutn.edu.tw:8080/cgit/PPTDL/hclin\\_091104025632.PDF](http://webcache.googleusercontent.com/search?q=cache:http://cgit.nutn.edu.tw:8080/cgit/PPTDL/hclin_091104025632.PDF).

Frehywot, S., Vovides, Y., Talib, Z., Mikhail, N., Ross, H., & Wohltjen, H. et al. (2013). *E-learning in medical education in resource constrained low- and middle-income countries*. *Human Resources For Health*, 11(1), 4. <http://dx.doi.org/10.1186/1478-4491-11-4>

Gearon, L. (2010). *Learning to teach citizenship in the secondary school*. London: Routledge.

Green, S., Nacheva-Skopalik, L., Pearson, E. (2008). *An Adaptable Personal Learning Environment for e-Learning and e-Assessment*. International Conference on Computer Systems and Technologies - CompSysTech'08 Herman Dwi, Herman Dwi. 'The Evaluation Of A Moodle Based Adaptive E-Learning System'. *IJIET* (2014): 89-92. Web.

<http://ocw.usu.edu/instructional-technology-learning-sciences/producing-distance-education-resources/resource30.html>

<http://www.cio.com/article/2386859/careers-staffing/careers-staffing-10-tips-for-making-self-evaluations-meaningful.html>

HubPages,. (2015). *Produce a learning programme / scheme of work in your subject area-PTLLS*. Retrieved 27 September 2015, from <http://livingsta.hubpages.com/hub/Produce-a-learning-programme-scheme-of-work-in-your-subject-area-PTLLS>

Kothari, C. R. (2004). *Research methodology: Methods and techniques*: New Age International.

- Kumar, S., Gankotiya, A. K., Dr. (Mrs) Dutta, K. (2011). *A Comparative Study of MOODLE with other e-Learning Systems*. pp. 414. IEEE.
- Lam G. (2002). “*Run-time White-Box Testing*”. Technical Report from Jolly Technologies. <<http://www.jollytech.com/>>
- Macho, H. J., Robles, G. (2013). *Preliminary Lessons from a Software Evolution Analysis of Moodle!*. *TEEM '13*, November 14 – 15, Salamanca, Spain. ACM.
- Mahanta, D. and Ahmed, M. (1, December 2012). *E-Learning Objectives, Methodologies, Tools and its Limitation*. International Journal of Innovative Technology and Exploring Engineering (IJITEE). ISSN: 2278.3075, Volume 2, Issue.
- Mehlenbacher, B., Holstein, K., Gordon, B., Khammar, K. (2010). *Reviewing the research on distance education and e-learning*. SIGDOC 2010, September 27-29, São Carlos-São Paulo, Brazil. ACM.
- Moodle. Citing Websites. *Moodle Mobile Developing a plugin tutorial*. [http://docs.moodle.org/dev/Moodle\\_Mobile\\_Developing\\_a\\_plugin\\_tutorial](http://docs.moodle.org/dev/Moodle_Mobile_Developing_a_plugin_tutorial)
- Moodle.org. (2015). *Moodle - Open-source learning platform | Moodle.org*. Retrieved 19 September 2015, from <http://www.moodle.org>
- Murchan, D., & Johnston, K. (n.d.). *Scheme of Work*. Professional Diploma in Education.
- Nunamaker, J. F., Chen, M., Purdin D.M.T. (1991). “*System Development in Information System Research*”. *Journal of Management Information Systems*. Vol. 7 No. 3 pp. 89-106.
- Phillips, R., McNaught, C., & Kennedy, G. (2012). *Evaluating e-learning*. New York: Routledge.
- Rice, W. (2011). *Moodle 2.0 e-learning course development*. Birmingham, UK: Packt Pub.

- Rößling, G., Crescenzi, P., Ithantola, P., McNally, M., Radenski, A., Sánchez-Torrubia, M. G. (2010). *Adapting Moodle to Better Support CS Education*. ITiCSE-WGR'10, June 26–30, Bilkent, Ankara, Turkey.
- Rubin, J., Chisnell, D., & Spool, J. (2011). *Handbook of Usability Testing Howto Plan, Design, and Conduct Effective Tests*. Hoboken: John Wiley & Sons.
- Saydam, S., Timms, W., Raval, S., Daly, C. (2013). *Using Moodle - An Open Source Learning Management System in Australian Mining Engineering Education*. IEEE International Conference in MOOC, Innovation and Technology in Education (MITE). pp. 386.
- Schlenker, B. (2008). *The eLearning Guild's Learning Solutions Practical Applications of Technology for Learning*. Learning Solutions e-Magazine. CA: Santa Rosa. pp. 1.
- System Testing: *What? Why? & How?* (n.d.). Retrieved from <http://www.softwaretestingclass.com/system-testing-what-why-how/>
- Trenas, M., Ramos, J., Gutierrez, E., Romero, S., & Corbera, F. (2011). *Use of a New Moodle Module for Improving the Teaching of a Basic Course on Computer Architecture*. IEEE Trans. Educ., 54(2), 222-228. doi:10.1109/te.2010.2048570
- Wang, C., Pai, W., & Yen, N. Y. (2011). A sharable e-Learning platform based on Cloud computing. *2011 3rd International Conference on Computer Research and Development*. doi:10.1109/iccrd.2011.5764071
- Zenha-Rela, M. and Carvalho, R. (2006). *Work in Progress: Self Evaluation Through Monitored Peer Review Using the Moodle Platform*. in *Frontiers in Education Conference, 36th Annual*. San Diego, CA: IEEE.