

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.



UUM
Universiti Utara Malaysia

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



**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
CHAPTER ONE INTRODUCTION.....	1
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
CHAPTER TWO LITERATURE REVIEW	10
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
CHAPTER THREE METHODOLOGY		30
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
CHAPTER FOUR EVALUATION OF EMBEDDING STRUCTURE		53
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

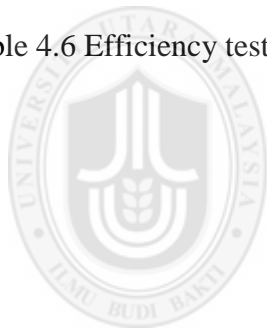
4.5	Bar Chart	64
4.6	Summary	65
CHAPTER 5 DISCUSSION OF RESULTS AND CONCLUSION.....		66
5.1	Introduction	66
5.2	Process Embedding Scheme of Work	66
5.3	Problem	68
5.4	Discussion	68
	5.4.1 SOW Structure	69
5.5	Research Constraints	69
5.6	Further Recommended Research	70
5.7	Conclusion	70
REFERENCES		72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



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 : http://localhost/testupload/upload.html	56
Figure 4.5 : Choose “realsow” file	57
Figure 4.6 : Choose the data	58
Figure 4.7: Refresh link: http://localhost/moodle/course/view.php?id=2	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.

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
- 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.