Nowadays, the popular methods of information delivering include e-learning, cyber-learning and other terms that describe the new ways of learning. In order to improve the learning process, the Virtual Learning Content Management System (V-LCMS) for Problem-Based Learning (PBL) Courses developed at the College of Professional MARA Indera Mahkota. The proposed system aims to develop a web site using Iterative and Incremental Development prototype. The programming language chosen is PHP 5.2.5, MySQL 5.0 as the database and Apache 2.2.8 as the the web server. The V-LCMS enables easier teaching and learning process between instructors and students. The students do not have to wait for the notes to be copied. Instead, the students can access the notes through V-LCMS. This facilitates the students to study by themselves. Other advantage of V-LCMS is, it eases students to interact with instructors using forums or chat rooms, especially for the implementation of PBL courses. Overall, not only the system assists the instructors, but also it supports their students in terms of receiving the knowledge imparted.

Norul Ashikin
Teddy Surya Gunawan
Mira Kartiwi

Norul Ashikin Abu Kasim obtained her bachelor degree from UTM in 2002, Master degree from IIUM in 2012, and currently a lecturer at MPCIM, Kuantan. Teddy Surya Gunawan received his PhD degree from UNSW in 2007 and currently Associate Professor at IIUM. Mira Kartiwi received her PhD from UOW in 2009 and currently Assistant Professor at IIUM.

Virtual-Learning Content Management System
Design and Implementation using Joomla for elearning and Problem-Based Learning Courses
Virtual-Learning Content Management System

Design and Implementation using Joomla for elearning and Problem-Based Learning Courses
ABSTRACT

Nowadays, there are new methods in the process of delivering information in terms of learning and teaching. The new methods of information delivering include e-learning, cyber-learning and other terms that describe the new ways of learning. Education cyberspace has become more popular as it makes sharing information between the students easier. Besides, it also assists the instructors to disseminate information more effectively. The purpose of the more effective delivery is to make it more convenient for the students to study before entering the class. In order to improve the learning process, the Virtual Learning Content Management System (V-LCMS) for Problem-Based Learning (PBL) Courses developed at the College of Professional MARA Indera Mahkota. There are two types of end users which are instructors and students. This system is focusing on uploading of the notes and collection of questions easily and quickly, and also easing the interactions between the instructors and the students. In addition, the system also aims to develop a web site using Iterative and Incremental Development prototype. The programming language chosen is PHP 5.2.5, MySQL 5.0 as the database and Apache 2.2.8 as the web server. The system makes teaching process for instructors become easier as the students are able to reach the notes in class or beforehand. The students do not have to wait for the notes to be copied. Instead, the students can access the notes through V-LCMS. This facilitates the students to study by themselves. Other advantages of this V-LCMS are it makes it easier for the students to interact with instructors using forums or chat rooms. The interactions mentioned above use PBL method. Overall, not only the system assists the instructors, but also it supports their students in terms of receiving the knowledge imparted.
TABLE OF CONTENTS

ABSTRACT .......................................................................................................................... i
TABLE OF CONTENTS ......................................................................................................... ii
LIST OF TABLES ..................................................................................................................... ii
LIST OF FIGURES ................................................................................................................ vi
LIST OF ABBREVIATIONS .................................................................................................... x
CHAPTER 1 Introduction ....................................................................................................... 1
1.1 Background ..................................................................................................................... 1
1.2 Research Background ..................................................................................................... 3
1.3 Problem Statement and Its Significance ......................................................................... 5
1.4 Research Objectives ....................................................................................................... 6
1.5 Research Methodology ................................................................................................. 6
1.6 Research Scope ............................................................................................................. 7
1.7 Book Organization ......................................................................................................... 8
CHAPTER 2 LITERATURE REVIEW ...................................................................................... 9
2.1 Introduction ..................................................................................................................... 9
2.2 Learning Content Management System (LCMS) .......................................................... 9
2.3 Existing LCMS Systems ............................................................................................... 12
2.3.1 Blackboard Learning System (WebCT) ..................................................................... 13
2.3.2 Modular Object-Oriented Dynamic Learning Environment (Moodle) ..................... 15
2.3.3 Joomla Software ....................................................................................................... 16
2.4 Current Learning Management Systems ....................................................................... 18
2.4.1 Case Study I: Rapid E-Learning Content Management System (RE-CoMS) ............ 18
2.4.2 Case Study II: Learning Management System Developed at the Eastern Mediterranean
University (EMU-LMS) ........................................................................................................ 20
2.4.3 Case Study III: A Comparison and Evaluation of Open Source Learning Management
Systems ................................................................................................................................. 21
2.5 Summary of Existing Systems ...................................................................................... 23
2.6 Problem-Based Learning (PBL) .................................................................................... 23
2.7 Current PBL ................................................................................................................... 24
2.7.1 Case Study I: Adopting Problem-based Learning in the Teaching of Engineering
Undergraduates: A Malaysian Experience ........................................................................ 25
2.7.2 Case Study II: Problem-Based Learning in Canadian Undergraduate and Continuing
Medical Education .............................................................................................................. 26
2.7.3 Case Study III: The Integration of Problem-Based Learning and Problem-Solving Tools
to Support Distributed Education Environments ................................................................ 27
2.8 Summary ....................................................................................................................... 28
CHAPTER 3 METHODOLOGY .......................................................................................... 29
3.1 Introduction ..................................................................................................................... 29
3.2 Research Methodology ................................................................................................ 29
3.2.1 Observation Method ................................................................................................ 30
3.2.2 Unstructured Interviews .......................................................................................... 31
3.2.3 Questionnaire Method ............................................................................................ 31
3.3 Software Development Methodology................................................................. 35
3.3.1 Waterfall Model......................................................................................... 35
3.3.2 Rapid Application Development (RAD).................................................... 36
3.3.3 Iterative and Incremental Development Model............................................ 36
3.4 V-LCMS Prototype Application Development Model...................................... 37
3.5 V-LCMS Diagram ......................................................................................... 39
3.6 V-LCMS Relational Schema Representation.................................................. 40
3.7 Justification of Platform ................................................................................. 42
3.7.1 Joomla! 1.5 ............................................................................................... 42
3.7.2 PHP: Hypertext Preprocessor ...................................................................... 44
3.7.3 MySQL 5.0 ............................................................................................... 45
3.7.4 Apache .................................................................................................... 46
3.8 Summary ..................................................................................................... 47
CHAPTER 4 RESULTS AND DISCUSSION ................................................................. 49
4.1 Introduction .................................................................................................. 49
4.2 User Interface .............................................................................................. 49
4.3 Results From Interviews .............................................................................. 52
4.4 Questionnaire Distribution ......................................................................... 53
4.5 Significant Result From Analysis of Variance (ANOVA)................................. 54
4.6 Results From Analysis of Direct Observations .............................................. 56
4.7 On the Use of Chatting and Forum Features for Problem-Based Learning (PBL) ................................................................. 58
4.7.1 Chatting Features .................................................................................... 58
4.7.2 Forum Features ....................................................................................... 61
4.8 Summary ..................................................................................................... 64
CHAPTER 5 CONCLUSIONS AND RECOMMENDATIONS ........................................ 65
5.1 Conclusions ................................................................................................ 65
5.2 Limitation ................................................................................................... 67
5.3 Recommendations ....................................................................................... 67
BIBLIOGRAPHY ................................................................................................. 69
APPENDIX A CLASSROOM OBSERVATION FORM .............................................. 73
APPENDIX B V-LCMS QUESTIONNAIRE FOR INSTRUCTORS............................. 77
APPENDIX C V-LCMS QUESTIONNAIRE FOR INSTRUCTORS............................. 79
APPENDIX D SCREENSHOTS OF V-LCMS .......................................................... 81