A FUNCTIONAL REQUIREMENT MODEL OF E-LEARNING SYSTEM IN SECONDARY SCHOOL IN DHI-QAR PROVINCE, IRAQ

RAED MOHAMMED HUSSEIN

MASTER OF SCIENCE (INFORMATION TECHNOLOGY)
SCHOOL OF COMPUTING
UUM COLLEGE OF ARTS AND SCIENCES
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


Kata kunci: e-pembelajaran, model keperluan, wilayah Dhi-Qar, sekolah menengah
Abstract

Recently, the modern technology simplifies the learning programs and support communication among students, teachers, parents, and the managements of schools in educational institutions. With this development, the existing electronic learning requirements do not meet all students’ or the educational institution’s needs, due to the varying students’ needs, goals, backgrounds, knowledge levels, and learning capabilities. Furthermore, prior literature also reveals some disadvantages of current online environment systems, including lack of interaction among users and difficulty of supporting co-operative work. On the other hand, the unstable environment and the insecure situation that Iraq currently faces prompts parents to avoid sending their children to school. In addition to that, in some parts of Dhi-Qar, there are three schools running in one building, operating at different times and there is a dearth of learning materials. With regard to requirement model, there is a lack of requirement model to develop the e-learning system specifically for the secondary school. In accordance to that, this study seeks to propose a functional requirement model of e-learning system to link the stakeholders or actors of the educational process in online environment. Data were collected through interviews and questionnaires. The user requirements were obtained from literature review and interview with users. They were translated into a prototype, which was designed using an open source platform, Moodle. Finally, acceptance and usability evaluation were conducted, using questionnaires. The results reveal that the participants are satisfied with the proposed requirements, and these requirements meet all the stakeholders’ needs. Therefore, the model proposed in this study can be used for particular education institutions and other conflict areas to complement the existing traditional classrooms.

Keywords: e-learning, requirement model, Dhi-Qar Province, secondary school
Acknowledgement

In the Name of Allah, the Most Gracious and Most Merciful

First and foremost, all praise to Allah for providing me with the strength, perseverance, and wisdom to have this work done on time.

I would like to take this opportunity to express my sincere appreciation to my supervisor Dr. Wiwied Virgiyanti for her advice, support, giving of practical exposure and fruitful discussion throughout this thesis without which I would not have succeeded in carrying out this research.

Deepest appreciation and heartfelt thankful goes to my Evaluators, AP Dr. Fauziah Baharom, and Dr. Nor Laily Hashim who supported me throughout my research process with their vital support and knowledge.

I want to express my gratitude and dedicate this thesis to my family. They encourage me and support me with confidence in my abilities to complete my study. I am also grateful to many individuals who have contributed to the development of the ideas and the completion of my thesis. Last but not least I would like to thank all my course mates who provided morale support and guidance to me for completing this thesis.

Raed Mohammed Hussein

2016
# Table of Contents

Permission to Use.................................................................................................................. ii

ABSTRAK .......................................................................................................................... iii

Abstract ............................................................................................................................. iv

Acknowledgement............................................................................................................. v

Table of Contents .............................................................................................................. vi

List of Figures ................................................................................................................... x

List of Tables ...................................................................................................................... xiii

List of Abbreviations ....................................................................................................... xvi

List of Appendixes .......................................................................................................... xvii

CHAPTER ONE ................................................................................................................. 1

INTRODUCTION .............................................................................................................. 1

1.0 Overview ................................................................................................................... 1

1.1 Background .............................................................................................................. 1

1.2 Problem Statement ................................................................................................. 5

1.3 Research Questions ............................................................................................... 8

1.4 Research Objectives ............................................................................................... 9

1.5 Scope of Study ........................................................................................................ 9

1.6 Significance of Study .......................................................................................... 10

1.7 Structure of the Thesis ......................................................................................... 11

1.8 Summary of Chapter One ................................................................................... 13

CHAPTER TWO .............................................................................................................. 14

LITERATURE REVIEW ................................................................................................. 14

2.1 Introduction ............................................................................................................ 14

2.2 Requirements Modelling ...................................................................................... 14

2.3 Requirement Model for E-learning ....................................................................... 17
List of Figures

Figure 2.1 System Components of E-learning (Hadjerrouit, 2007)...............................23
Figure 2.2 Approaches in E-learning Environments (Brown, 2003; 2005).................26
Figure 2.3 Requirements or Tools based on the Lotif et al (2013).............................42
Figure 2.4. Open, Flexible, and Distributed Web-based Learning (Khan, 2010)...........46
Figure 2.5. Khan’s Model (Khan, 2010) ................................................................47
Figure 2.6. Salmon’s Model for Teaching and Learning Online (Salmon, 2000)......51
Figure 2.7. ADDIE Model (Dick, Carey & Carey, 2001)........................................54
Figure 2.8. DIY E-learning Model (Thompson & Lamshed, 2006)............................59
Figure 3.1. A Research Process of Systems Development in Information Systems
Research (Nunamaker and Chen, 1990; Nunamaker, Chen and Purdin, 1991).........73
Figure 4.2. Number of Participants Included in Interview ......................................92
Figure 5.1. Use case Diagram ................................................................................120
Figure 5.2. Manage Course Use case .......................................................................121
Figure 5.3. Manage Curriculum Use case .............................................................121
Figure 5.4. Manage Communication Use case ......................................................122
Figure 5.5. Manage User Use case .........................................................................122
Figure 5.6. Evaluate Student Use case ....................................................................123
Figure 5.7. Support Learning Use case ....................................................................123
Figure 5.8. Share Repository Use case ....................................................................124
Figure 5.9. Login Activity Diagram .........................................................................137
Figure 5.10. Create course Activity Diagram ......................................................138
Figure 5.11. Edit course Activity Diagram .............................................................138
Figure 5.12. Create Class Activity Diagram ...........................................................139
Figure 5.13. Set Eligible User Activity Diagram ....................................................139
Figure 5.14. Upload and Download Material Activity Diagram...............................140
Figure 5.15. Post/ Submit Assignment Activity Diagram ........................................140
Figure 5.16. Post/ Submit Online Survey Activity Diagram ....................................141
Figure 5.17. Post/ Submit Quiz Activity Diagram ..................................................141
Figure 5.18. Upload and View Grades Book Activity Diagram ...............................142
Figure 5.19. Use Forum Activity Diagram ..............................................................142
Figure 5.20. Use Real Time Chat Activity Diagram ................................................143
Figure 5.21. Send Mail Activity Diagram ................................................................. 143
Figure 5.22. Manage Calendar Activity Diagram ...................................................... 144
Figure 5.23. Share White Board Activity Diagram ..................................................... 144
Figure 5.24. Publish Announcement Activity Diagram ............................................. 145
Figure 5.25. Search Facility Activity Diagram ......................................................... 145
Figure 5.26. Share Folder Content Activity Diagram ............................................... 146
Figure 5.27. Share Media Library Activity Diagram .................................................. 146
Figure 5.28. Share Syllabus Activity Diagram ......................................................... 147
Figure 5.29. Share Web Kink Activity Diagram ....................................................... 147
Figure 5.30. Share Web Kink Activity Diagram ....................................................... 148
Figure 5.31. View Online Guide Activity Diagram ................................................... 148
Figure 5.32. View Personal Work Space Activity Diagram ..................................... 149
Figure 5.33. View Activity Tracking Activity Diagram .......................................... 149
Figure 5.34. Add New User Activity Diagram .......................................................... 150
Figure 5.35. Update User Information Activity Diagram ........................................ 150
Figure 5.36. Delete User Activity Diagram .............................................................. 151
Figure 5.37. Login Sequence Diagram ...................................................................... 152
Figure 5.38. Create Course Sequence Diagram ....................................................... 152
Figure 5.39. Edit Course Sequence Diagram ............................................................ 152
Figure 5.40. Create Curriculum Sequence Diagram .............................................. 153
Figure 5.41. Download Materials Sequence Diagram ............................................. 153
Figure 5.42. Upload Materials Sequence Diagram .................................................. 153
Figure 5.43. Set Eligible User Sequence Diagram .................................................. 154
Figure 5.44. Share Content Folder Sequence Diagram ........................................... 154
Figure 5.45. Share Web Link Sequence Diagram ..................................................... 155
Figure 5.46. Share Media Library Sequence Diagram ............................................. 155
Figure 5.47. Share Syllabus Sequence Diagram ....................................................... 156
Figure 5.48. Search Facility Sequence Diagram ...................................................... 156
Figure 5.49. View FAQ Sequence Diagram .............................................................. 156
Figure 5.50. View Personal Work Space Sequence Diagram .................................. 157
Figure 5.51. View Online Guide Sequence Diagram .............................................. 157
Figure 5.52. Use Real Time Chat Sequence Diagram ............................................ 157
Figure 5.53. Publish Announcement Sequence Diagram ....................................... 158
Figure 5.54. Manage Calendar Sequence Diagram ..................................................... 158
Figure 5.55. Send Mail Sequence Diagram .............................................................. 159
Figure 5.56. Use Forum Sequence Diagram ............................................................. 159
Figure 5.57. Share White Board Sequence Diagram ............................................... 160
Figure 5.58. Post Assignment Sequence Diagram .................................................... 160
Figure 5.59. Submit Assignment Sequence Diagram .............................................. 161
Figure 5.60. Post Quiz Sequence Diagram .............................................................. 161
Figure 5.61. Submit Quiz Sequence Diagram .......................................................... 162
Figure 5.62. Upload Grades Book Sequence Diagram ............................................. 162
Figure 5.63. View Grades Book Sequence Diagram .............................................. 162
Figure 5.64. Post Online Survey Sequence Diagram ............................................. 163
Figure 5.65. Submit Online Survey Sequence Diagram ....................................... 163
Figure 5.66. View Activity Tracking Sequence Diagram ..................................... 163
Figure 5.67. Add User Sequence Diagram ............................................................ 164
Figure 5.68. Update User Information Sequence Diagram .................................. 164
Figure 5.69. Delete User Sequence Diagram ....................................................... 164
Figure 5.70. Class Diagram ..................................................................................... 165
Figure 5.71. The Main Page .................................................................................... 166
Figure 5.72. Login Page ......................................................................................... 167
Figure 5.73. Teacher Page ....................................................................................... 168
Figure 5.74. Student Page ....................................................................................... 168
Figure 5.75. Manager Page ..................................................................................... 169
Figure 5.76. Parent Page ......................................................................................... 170
Figure 6.1. Region Distribution ............................................................................. 170
Figure 6.2. Users’ Roles ......................................................................................... 177
Figure 6.3. Students’ Grades .................................................................................. 178
List of Tables

Table 2.1 Studies of Requirement Model for E-learning........................................18
Table 2.2 Strengths and Weaknesses of Online Learning based on the Previous
    Studies.................................................................................................................. 28
Table 2.3 Tools in Online Learning System (Buzzetto-More, 2007) ....................... 37
Table 2.4 E-learning Tools based on the Al-Ajlan (2012)........................................ 43
Table 2.5 Limitations of the previous studies............................................................. 44
Table 2.6 Dimensions and Sub-dimensions of the Web-based Learning Model (Khan,
    2010)................................................................................................................... 48
Table 2.7 Electronic Learning Platforms................................................................. 62
Table 2.8 Comparison between 12 Platforms based on Learner Tools (Al-Ajlan
    ,2012).................................................................................................................. 63
Table 2.9 The Comparison between 12 Platforms based on Support Tools (Al-Ajlan
    ,2012).................................................................................................................. 64
Table 2.10 The Comparison between 12 Platforms based on Technical Tools (Al-
    Ajlan ,2012) ........................................................................................................ 66
Table 2.11 Summary of the Comparison between 12 Platforms (Al-Ajlan ,2012) .... 68
Table 3.1 Population (Appendix A)........................................................................ 85
Table 3.2 Sample ........................................................................................................ 86
Table 4.1 Functional Requirements Elicitation ...................................................... 89
Table 4.2 Features Related to Students for E-LS...................................................... 101
Table 4.3 Features Related to Teachers for E-LS..................................................... 105
Table 4.4 Features Related to the Management of School for E-LS ....................... 108
Table 4.5 Features Related to Parents for E-LS....................................................... 109
Table 4.6 List of Functional Requirements According to Users’ Feedback........... 110
Table 4.7 The Experts’ Feedback ............................................................................. 112
Table 4.8 The Final List of Requirements ............................................................... 114
Table 5.1 Functional requirements ........................................................................ 117
Table 5.2 Use Case Specification for Login System .............................................. 125
Table 5.3 Use Case Specification for Manage Curriculum .................................... 126
Table 5.4 Use Case Specification for Manage Course ........................................... 127
Table 5.5 Use Case Specification for Share Repository .......................................... 128
Table 5.6 Use Case Specification for Support Learning........................................... 130
Table 5.7 Use Case Specification for Manage Communication ............................... 130
Table 5.8 Use Case Specification for Evaluate Student ........................................... 133
Table 5.9 Use Case Specification for Manage User ................................................. 135
Table 6.1 Summary of Experts’ Review ................................................................... 173
Table 6.2 Mean Values of the Expert Review findings ............................................ 174
Table 6.3 Reliability for Acceptance Evaluation ...................................................... 175
Table 6.4 Region Distribution................................................................................... 176
Table 6.5 User Role .................................................................................................. 177
Table 6.6 Perceived Communication- Question1 .................................................... 179
Table 6.7 Perceived Communication - Question2 .................................................... 180
Table 6.8 Perceived Communication - Question3 .................................................... 180
Table 6.9 Perceived Communication - Question4 .................................................... 181
Table 6.10 Perceived Communication - Question5 .................................................. 181
Table 6.11 Perceived Communication - Question6 .................................................. 182
Table 6.12 Perceived Usefulness - Question7 ......................................................... 183
Table 6.13 Perceived Usefulness – Question 8 ....................................................... 183
Table 6.14 Perceived Usefulness – Question 9 ....................................................... 184
Table 6.15 Perceived Usefulness – Question 10....................................................... 184
Table 6.16 Perceived Ease of Use – Question 11 .................................................... 185
Table 6.17 Perceived Ease of Use – Question 12 .................................................... 186
Table 6.18 Perceived Ease of Use – Question 13 .................................................... 186
Table 6.19 Perceived Ease of Use – Question 14 .................................................... 187
Table 6.20 Perceived Ease of Use – Question 15 .................................................... 187
Table 6.21 Perceived Satisfaction – Question 16 .................................................... 188
Table 6.22 Perceived Satisfaction – Question 17 .................................................... 188
Table 6.23 Perceived Satisfaction – Question 18 .................................................... 189
Table 6.24 Perceived Satisfaction – Question 19 .................................................... 190
Table 6.25 Descriptive Statistics............................................................................... 191
Table 6.26 Question 1.............................................................................................. 192
Table 6.27 Question 2............................................................................................... 192
Table 6.28 Question 3............................................................................................... 193
Table 6.29 Question 4............................................................................................... 193
## List of Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-learning</td>
<td>Electronic learning</td>
</tr>
<tr>
<td>ICT</td>
<td>Information and Communication Technologies</td>
</tr>
<tr>
<td>E-LS</td>
<td>E-Learning System</td>
</tr>
<tr>
<td>Moodle</td>
<td>Modular Object- Oriented Dynamic Learning Environment</td>
</tr>
<tr>
<td>SDISR</td>
<td>Systems Development in Information Systems Research</td>
</tr>
<tr>
<td>UML</td>
<td>Unified Modeling Language</td>
</tr>
<tr>
<td>RE</td>
<td>Requirement Engineering</td>
</tr>
<tr>
<td>SDL</td>
<td>Specification and Description Language</td>
</tr>
<tr>
<td>KSS</td>
<td>knowledge sharing system</td>
</tr>
<tr>
<td>LMS</td>
<td>Learning Management System</td>
</tr>
<tr>
<td>FR</td>
<td>Functional Requirements</td>
</tr>
<tr>
<td>NFR</td>
<td>Non-Functional Requirements</td>
</tr>
<tr>
<td>SRS</td>
<td>Software Requirements Specification</td>
</tr>
</tbody>
</table>
List of Appendixes

Appendix A: Official Letters
Appendix B: Interview’s Questions
Appendix C: Acceptance Questionnaire
Appendix D: Usability Questionnaire
Appendix E: Experts’ Notes
Appendix F: Questionnaire for Expert review
Appendix G: Experts’ Profile
Appendix H: Experts’ Review Instrument
CHAPTER ONE
INTRODUCTION

1.0 Overview

This chapter explains the background of Iraqi pre-tertiary education system and the demand for electronic technologies for better delivery of teaching and learning experience. It thus forms then study’s problem statement which borders on the need for e-learning system in Iraq generally and requirement-based e-learning systems specifically for its secondary schools. This highlights the research questions to be answered by this study, and its corresponding research objectives to be accomplished. Also discussed in this chapter is the significance of this study practically and theoretically, as well as the scope that delineates the boundary that the study covers.

1.1 Background

Requirement engineering ensures that the tool or system under design is in alliance with the standard requirements, and in line with the expected functions of the system. It is opined that a sound requirement engineering process is a requisite to a functional and usable system (Shams-Ul-Arif et al., 2010). The requirement analysis of the previous studies on e-learning systems and available documentation, with users’ study, will actualise an e-learning system that attends to the task needs of the users, which in this instance are Iraqi pre-tertiary students.

The requirements modeling plays a fundamental role in the Requirement Engineering (RE) process (Nuseibeh & Easterbrook, 2000) as it delivers a structured description of requirements that can be used throughout the requirements process and the rest of the software development processes. In addition, it is a main communication language...
The contents of the thesis is for internal user only
References


Beckmann, E. A 2010 Learners on the move: mobile modalities in development studies. *Distance Education*, 31 (2), pp. 159–173. DOI: http://dx.doi.org/10.1080/01587919.2010.498081


Lim, B, Hong, KS & Tan, KW 2008, 'Acceptance of E- learning Among Distance Learners: A Malaysian Perspective,' *Hello! Where are you in the landscape of educational technology?*, 541-551.


