

DEVELOPMENT OF E-LEARNING ON
FUNDAMENTALS OF BIOLOGY

Thesis

CHRISTIAN T. CROOC
JAY D. MARAAN

College of Engineering and Information Technology
CAVITE STATE UNIVERSITY
Indang, Cavite

Cavite State University



T4421

THESIS/SP 371.33 C88 2011

April 2011

DEVELOPMENT OF E-LEARNING ON FUNDAMENTALS OF BIOLOGY

Undergraduate Thesis
Submitted to the Faculty of the
College of Engineering and Information Technology
Cavite State University
Indang, Cavite

In partial fulfillment
of the requirements for the degree of
Bachelor of Science in Information Technology

CHRISTIAN T. CROOC
JAY D. MARAAN

April 2011

ABSTRACT

CROOC, CHRISTIAN T. and MARAAN, JAY D. E-learning on Fundamentals of Biology. An Undergraduate Thesis. Bachelor of Science in Information Technology. Cavite State University, Indang, Cavite. April 2011. Adviser: Ms. Charlotte B. Carandang.

The study entitled, “E-learning on Fundamentals of Biology” was conducted to serve as a teaching aid in studying the subject which presents lessons based on the standard course outline given by the faculty of the Biological Sciences. It is a learning technique wherein students can study online. It enables the users to access the system through the Internet.

The system was developed for the benefit of the instructor and students of Fundamentals of Biology subject. It served as quick reference to students for better understanding the lesson and helped the instructors when they encounter conflicts whenever they leave their class for important activities like seminars and meetings and by lessening their time consumed for preparing modules.

The main objective of the study was to develop a learning management system on Fundamentals of Biology wherein students can study their lessons through the use of web, to make advantage of its visual environment and interactive nature. This promoted an educational tool wherein college students were entertained and at the same time, they learned and gained knowledge. This is one way of helping the students to be more interested to the subject matter. The system was developed to help the students complete their training conveniently during off-hours. It also assessed the learning ability of students by giving exams after the entire chapter was presented and served as a teaching aid for the instructors of the subject.

The paradigm used to detail the system was WISDOM Methodology. One of the objectives of the paradigm was to identify the resources needed for the development of the system. These resources included the course outline for the subject, lessons and other references related to the subject. It was accomplished through the first phase of the WISDOM Methodology, the inception phase. In this phase, information and requirements were gathered through observation and interviews to determine the functional requirements and resources needed for the development of the system defined for the internal workings of the system. Elaboration phase is followed wherein included functional specifications and architectural view. It involved user interface that determined user objectives and produced any materials required for instruction in the given subject. The development of components and other features of the system and construction of the database were under of Construction phase. Designing of database and the distribution of data were also conducted. Modules of the system were also built. Evaluation of the system was the last phase and was done for the purpose of determining whether the system have met the needs and expectation of the client. Each module of the system was tested to verify that the detailed design for the unit that has been correctly implemented. Each module of the system was tested to verify the detailed design for the unit has been correctly implemented.

TABLE OF CONTENTS

	Page
BIOGRAPHICAL DATA.....	iii
ACKNOWLEDGEMENT.....	v
ABSTRACT.....	vii
TABLE OF CONTENTS.....	ix
LIST OF TABLES.....	xi
LIST OF FIGURES.....	xii
LIST OF APPENDIX TABLES.....	xiii
LIST OF APPENDIX FIGURES.....	xv
INTRODUCTION.....	1
Statement of the Problem.....	2
Theoretical Framework.....	5
Importance of the Study.....	9
Objectives of the Study.....	10
Time and Place of the Study.....	10
Scope and Limitation of the Study.....	11
Definition of Terms.....	15
REVIEW OF RELATED LITERATURE.....	17
Related Literature.....	17
E-learning.....	18
Learning Content Management System.....	19
Learning Management System.....	20

Trends of E-learning Technologies..... 20

E-learning in the Philippines..... 23

Interactive System Development..... 24

WISDOM (Whitewater Interactive System Development
with Object Models)..... 25

Related System of WISDOM..... 26

Fishbone Diagram..... 27

Unified Modeling Language..... 28

Use Case Diagram..... 29

Class Diagram..... 30

Sequence Diagram..... 31

Review of Related System..... 32

Commercial Software 32

Related System..... 35

MATERIALS AND METHODS..... 40

Materials..... 40

Methods..... 41

RESULTS AND DISCUSSION..... 47

SUMMARY, CONCLUSION AND RECOMMENDATION..... 69

Summary 69

Conclusion..... 71

Recommendation..... 72

BIBLIOGRAPHY..... 73

APPENDICES..... 75

LIST OF TABLES

Table		Page
1	Breakdown of Respondents.....	60
2	Results of Evaluation of the Respondents	61
3	User Interaction Assessment of the Software.....	62
4	Reliability Assessment of the Software.....	63
5	Consistency Assessment of the Software.....	64
6	Accuracy Assessment of the Software.....	65
7	Efficiency Assessment of the Software	66
8	Assessments of respondents on Information in the program of the Software	67
9	Assessments of respondents on Technical aspects of the Software	68

LIST OF FIGURES

Figure		Page
1	Theoretical framework.....	8
2	WISDOM Methodology.....	41
3	Screen layout of Log-in page.....	49
4	Screen layout of Homepage.....	50
5	Screen layout of Profile Page.....	51
6	Screen layout of Lesson Page.....	52
7	Screen layout of Assessment Page.....	53
8	Screen layout of Assignment Page.....	54
9	Screen layout of Gradebook Page.....	55
10	Screen layout of Glossary Page.....	56
11	Screen layout of Bulletin board Page.....	57
12	Screen layout of Forum Page.....	58
13	Screen layout of Administrator's Student Page.....	59

LIST OF APPENDIX TABLES

Appendix Table	Page
1 Comparative Table of Commercial Software.....	77
2 Comparative Table of Related Systems.....	78
3 Actor Glossary.....	81
4 Use Case Glossary for Security (Login/Logout).....	82
5 Use Case Glossary for Profile.....	82
6 Use Case Glossary for Content.....	83
7 Use Case Glossary for Examination.....	84
8 Use Case Glossary for Assignment.....	85
9 Use Case Glossary for Glossary.....	85
10 Use Case Glossary for Bulletin Board.....	86
11 Use Case Glossary for Discussion Forum.....	87
12 Class Specification for Profile.....	88
13 Class Specification for Lesson.....	89
14 Class Specification for Examination.....	90
15 Class Specification for Assignment.....	91
16 Class Specification for Bulletin Board.....	92
17 Class Specification for Discussion Forum.....	92
18 Class Specification for Glossary.....	93
19 Iteration Activities for Inception.....	141
20 Iteration Schedule for Inception.....	142

Appendix Table		Page
21	Iteration Deliverables for Inception.....	142
22	Iteration Activities for Elaboration.....	144
23	Iteration Schedule for Elaboration.....	145
24	Iteration Deliverables for Elaboration.....	148
25	Iteration Activities for Construction.....	149
26	Iteration Schedule for Construction.....	150
27	Iteration Deliverables for Construction.....	152
28	Iteration Activities for Transition.....	153
29	Iteration Schedule for Transition.....	153
30	Iteration Deliverables for Transition.....	154
31	Interview Report.....	179
32	Unit Testing.....	183
33	Integration Testing.....	185
34	Acceptance Testing.....	190

LIST OF APPENDIX FIGURES

Appendix Figure	Page
1 Statistics of submission of assignment on deadline date.....	95
2 Instructional materials used in presenting lesson.....	95
3 Instructional materials enough to understand by students.....	96
4 Fishbone Diagram for inability to handles increasing number of students.....	97
5 Fishbone Diagram for inflexible tracking of evaluation records of student.....	98
6 Fishbone Diagram for low student's learning motivation.....	99
7 Use Case Diagram for Log-in Subsystem.....	100
8 Use Case Diagram for Profile Subsystem.....	101
9 Use Case Diagram for Gradebook.....	101
10 Use Case Diagram for Class Gradebook	102
11 Use Case Diagram for Lesson Subsystem.....	102
12 Use Case Diagram for Glossary Subsystem.....	103
13 Use Case Diagram for Examination Subsystem.....	103
14 Use Case Diagram for Assignment Subsystem.....	104
15 Use Case Diagram for Bulletin Board.....	104
16 Use Case Diagram for Discussion Forum.....	105
17 Use Case Diagram for Reports.....	105
18 Use Case Diagram for Maintain Instructor Information.....	106

Appendix Figure	Page
19 Use Case Diagram for Maintain Student Information.....	106
20 Sequence Diagram for Log-in Subsystem.....	107
21 Sequence Diagram for Lesson Subsystem.....	108
22 Sequence Diagram for Examination Subsystem.....	109
23 Sequence Diagram for Assignment Subsystem	110
24 Sequence Diagram for Reports Subsystem.....	111
25 Activity Diagram for Manage Lesson.....	112
26 Activity Diagram for Manage Quiz.....	113
27 Activity Diagram for Manage Assignment.....	114
28 Activity Diagram for Manage Glossary.....	115
29 Activity Diagram for Manage Bulletin.....	116
30 Class Diagram.....	117
31 Gantt Chart.....	118
32 Use Case Specifications.....	120
33 Textual Description.....	139
34 Sample Code.....	156
35 Course Syllabus.....	174
36 System Checklist.....	187
37 Certification.....	207

DEVELOPMENT OF E-LEARNING ON FUNDAMENTALS OF BIOLOGY

**CHRISTIAN T. CROOC
JAY D. MARAAN**

^{1/}An undergraduate thesis submitted to the faculty of the Department of Information Technology, College of Engineering and Information Technology, Cavite State University, Indang, Cavite in partial fulfillment of the requirements for the degree of Bachelor of Science in Information Technology with Contribution No. CEIT 2010-2011 018. Prepared under the supervision of Ms. Charlotte B. Carandang.

INTRODUCTION

The use of technology supported teaching and learning in education has integrated to almost in every countries. Rapid innovation in information and communications technology (ICT) was transforming the way of human work, interacts, learned and lived. In the education sector, multimedia technology makes possible to illustrate and instruct complex processes. Computer courseware (e.g. an E-learning) could be effectively designed using a systems approach as well as integrates appropriate instructional systems designs (Tandingan, 2007).

E-learning is a form of technology to delivered training and other educational materials. It is a type of distance learning that provides solution to improved performance, skills and competencies of learners. E-learning involves the used of computer or electronic device in providing training, educational or learning material (Stockley, 2003). It brought about convergence between learning, networks, new technologies and economy. Some benefits of e-learning are lower costs and larger