

UNIVERSITI TEKNOLOGI MARA

**AN ANIMATED PEDAGOGICAL AGENT FOR
LEARNING INTRODUCTION TO OBJECT
ORIENTED PROGRAMMING CONCEPT**

ADIB B SARKAWI

**Dissertation submitted in part-fulfillment of the requirements
for the degree of
Master of Science (Computer Science)**

Faculty of Information Technology and Quantitative Science

April 2008

ABSTRACT

Animated pedagogical agents or APA are animated characters that encourage interactive learning environment (in response to student's or user's actions). Additionally, the agents also play powerful motivational roles as they interact with students. In this project, a multimedia learning application with animated pedagogical agents called OOP – Concept has been developed, where it is able to provide high motivational support for the student, particularly in learning Introduction to Object Oriented Programming Concept. Besides that, evaluations of the application usability (questionnaires and interviews) were also carried out, where levels of the users' satisfactions towards OOP – Concept were identified. The samples involved were 30 Object Oriented Programming I (CSC175) students of University of Mara Technology, Sarawak campus. Notably, the study revealed that the presence of the appealing animated pedagogical agents has produced strong positive effects on the students' perceptions in their learning experiences. The study has also illustrated that most of the students were more motivated and interested to interact with the application as it was equipped with the animated pedagogical agents.

ACKNOWLEDGEMENTS

First and foremost, I would like to thank Allah S.W.T for giving the strength and capability to complete this work.

I would like to extend my deepest gratitude and sincere appreciation to those who have directly and indirectly, assisted me in bringing this study to its present form.

My Supervisor

Madam Marina Ismail

(Faculty of Information Technology and Quantitative Science, UiTM Malaysia)

My wife, Aiza binti Johari and my family

The backbones of this study

Fellow Lecturers

UiTM Malaysia and UiTM Sarawak

My Classmates

Master of Science (Computer Science) Dec 2006 Class

And last but not least, my sincere thanks to my housemates for the moral support and CSC175 students of UiTM Sarawak who participated in this study.

TABLE OF CONTENTS

CONTENTS	PAGE
ABSTRACT	ii
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	viii
LIST OF FIGURES	x
LIST OF APPENDICES	xii

CHAPTER 1	INTRODUCTION	PAGE
1.1	Background	1
1.2	Problem Statement	2
1.3	Objectives	3
1.4	Research Questions	4
1.5	Significance of the Study	4
1.6	Limitation of the Study	5
1.7	Scope of Study	5
1.8	Conceptual Framework	6
1.9	Definitions of Terms	8
1.10	Conclusion	9

CHAPTER 2	LITERATURE REVIEW	PAGE
2.1	Introduction	10
2.2	Animated Pedagogical Agent	10
	2.2.1 Desirable Characteristics	12
	2.2.2 Types of Interactions	14
	2.2.3 Architectures	15
2.3	Expected Benefits of Introducing Animated Pedagogical Agent	16
2.4	Behaviour Space	17
2.5	Learning Theories and Strategy for Application Development (Cognitive Learning Theory)	18
2.6	Previous Study of Animated Pedagogical Agent	22

2.7	Previous Study on Solution for Learning Object Oriented Programming	26
2.8	Instructional System Design (ISD) Model	31
2.9	Users' Satisfaction	32
2.10	Conclusion	34

CHAPTER 3 RESEARCH METHODOLOGY PAGE

3.1	Introduction	35
3.2	Development of Multimedia Prototype Application (OOP – Concept)	35
3.2.1	Methodology of Development Multimedia Prototype Application	35
3.2.2	OOP – Concept Development Life Cycles Model	36
3.2.2 (i)	Phase 1: Analysis	37
3.2.2 (ii)	Phase 2: Design	40
3.2.2 (iii)	Phase 3: Development	53
3.2.2 (iv)	Phase 4: Implementation	57
3.2.2 (v)	Phase 5: Evaluation	59
3.3	Methodology on Evaluation	59
3.3.1	Evaluation Research Design	59
3.3.2	Research Sample	60
3.3.3	Research Tool	60
3.3.4	User Satisfaction Data Collection Procedures	63
3.3.5	Data Evaluation Analysis Technique	66
3.3.6	Reliability Test	69
3.4	Conclusion	70

CHAPTER 4 RESEARCH FINDING PAGE

4.1	Introduction	71
4.2	Identifying and Designing the Methodology for Developing Multimedia Learning Application with Animated Pedagogical Agent: OOP – Concept Life Cycle	72
4.2.1	Identify Characters and Gestures for Animated Pedagogical Agent	73