CHAPTER 1

INTRODUCTION

1.0 Introduction

Learning is a process of gaining knowledge, skills, experience or values by studying, experience or training (APTL, 2002). It should be like part of a human life. No matter in what subjects, everyone should require a minimum learning process to get to know about the subjects. Learning process may vary from one person to another, depending on their learning style.

Learning styles are the ways of learning or how people concentrate, process and memorize new information (Cuesta, 2003). There are several types of learning styles, including visual learning, auditory learning, read-write learning and kinesthetic learning (LdPride; William, 2004). Visual learners learn best when information is presented visually and in a written language, picture or designs format. Auditory learners learn best when information is presented in an oral language format. Read-write learners learn best when notes are taken and kinesthetic learners learn best when the learner is physically involved in an activity (DVC, 2000; William & Richard, 2004).

With the widespread use of computers in the past few years, integration of learning process and ICT has a big impact on the education system and students respectively. Students can learn more easily through any combination of learning styles in e-learning that include hearing, seeing, writing, reading and illustration. This enables students of the next generation ready to compete in the global and challenging world.

Electronic learning or e-learning is another way of teaching and learning. E-learning is a mode of knowledge production and circulation wherein information technologies plays a decisive role (Polsani, 2002). E-Learning is an instruction that delivers via all electronic media including the Internet, intranets, extranets, satellite broadcasts, audio/video tape, interactive TV, and CD-ROM (Thavamalar, 2001). E-learning gives a more flexible, focused curriculum (Toni, 2005). In order to implement a successful e-learning exercise, e-learning should meet a list of desired attributes, including developing content, storing and managing content, packaging content, student support and assessment (Thavamalar, 2001). Because of this, ICT practitioners have come out with a new concept that can be integrated in e-learning. It is called Learning Objects.

Learning Objects has become a popular topic in recent years. This new approach for developing reusable learning content has been increasingly gaining attention among educational technology and computer science researchers (Mohan, 2004). Learning Objects is developed in smaller manageable chunks and designed specially for flexibility and re-use, which is then stored in the database and tagged for easy searches. The basic idea behind this new approach is that a small component can be reused in different instructional contexts, and to make e-learning system more reusable, interoperable, durable and accessible (Frosch-Wilke, 2004). All these features are going to make the learning system become more independent and intelligent.

This project title is "Using Learning Objects Technology In Learning Styles Of Higher Education Students" and it is called LOOOP. Learning Objects is the fundamental idea in developing the Learning Objects system for this project and object-oriented programming is the domain of the system. LOOOP is developed to support learners learning in a new learning environment and transforms traditional learning style to digital environment based on the Learning Objects approach. In addition, LOOOP is also

developed to overcome the identified expectations of e-learning and the desired attributes of e-learning.

1.1 Problem Statements

Nowadays, in this information technology age, E-learning plays an important role in learning. Although this is happening, based on the survey collected, most of the learners prefer to learn in a traditional learning style rather than a digital environment because of the lack of learning aid software found in the market. Lack of functions like jotting down notes and information finding in the e-learning system to support learning is also one of the reasons for learners not to study in a digital environment. Although learners can have information finding from the Internet, they need to print out the information in hardcopy or save in softcopy and bring along the information whenever they need it. Besides, some of the e-learning courses found do not meet with the required attributes of e-learning, like developing content, storing and managing content, packaging content, student support and assessment (Thavamalar, 2001). Although this problem can be overcome with Learning Objects approach, some of the contents are fixed and can only be modified by the moderators. Besides, lack of discussion and information sharing within learners can also be an important issue in gaining new knowledge.

1.2 Project Significance

Learning Objects has become a popular topic in recent years. Developing the Learning Objects enables the learning contents to be reused, durable, interoperable and accessible. Generally, Learning Objects which is developed in small units and self-contained is saved in a Learning Objects repository. Learning Objects with difference context is able to save in a same repository and it can be retrieved independently in study,

sharing and easier to manage. With an online Learning Objects repository, the Learning Objects that has been modified on one computer can be retrieved on another computer. This has increased the accessibility of the information needed and learners do not need to always bring along the hardcopy or softcopy. Thus, Learning Objects can be modified from time to time to ensure the content of Learning Objects is always up to date. Besides developing the initial Learning Objects in this project, the system can be an alternative for learners who wish to use it in study and change from traditional learning style to digital environment where the system enables learners to jot down notes, modify the contents and perform information searching. Furthermore, the system can be a place for learners to share their learning contents or notes and can also be a place for discussion among learners.

1.3 Project Objectives

The main objective of this project is to design and develop a Learning Objects system specifically the learning styles application by using reusable informational Learning Objects technology. The domain of this project is C language programming course. Besides, there are four project sub-objectives. The sub-objectives are as follows.

1. To provide an alternative system to support learning

   LOOOP can be a system that can transform traditional learning style from using books or notes to an interactive learning environment.

2. To provide support for learners in information finding and recording

   In LOOOP, an information searching agent acts as a virtual instructor for students and Google.com is the information storage center. Information searching agent searches the most related solution URL via Google.com when user keys in a problem. User can link to the page and saves it as new learning contents.

3. To provide a communication tool

   LOOOP enables user to share the learning contents with friends through learning contents sharing function. This function also allows instructors to share the new learning content notes if they use this system as a teaching material. Besides, LOOOP also provides a communication tool that can communicate within LOOOP registered users.

4. To give immediate feedback promptly to learners who need information

   Google.com is known as one of the Internet leading search engine (THES, 2004). If the Google.com server is not terminated or down, the server can work twenty-four hours a day and seven days a week. Information searching agent that acts as a virtual instructor is able to give immediate feedback to user when they needed any information.

1.4 Project Scope

The completion of this project not only needs to meet and accomplishes the objectives. Project scope is also needed to meet and avoid the outcome of running out of topic. The main scope of this project is to develop an informational type of Learning Objects system that provides information to learners. LOOOP is not only needed to present information to learners but also needs to solve learners' problem. In addition, the system also needs to transform traditional learning styles to digital environment. For this purpose, the scopes that are included in this project are as follows.

1. Database module

   Designing and implementing a Learning Objects repository for this project to save all the existing and new Learning Objects that can be modified, searched and reused in a different context.

2. Searching module

Developing an Information searching agent for information searching from the Internet or database, finding solution for problems from the Internet and the information found is enabled to save as new Learning Objects.

3. Learning style module

Developing a set of features tool that enables user to perform traditional learning styles such as highlighting the important text and jotting down notes on Learning Objects and enables user to navigate the learning content, shares the learning content with other user, media-playing on multimedia resources including sound, animation and video, as well as applying reader agent that could read the learning content.

4. Communication module

Developing a communication tool for LOOOP registered users to communicate with each other and make discussion.

1.5 Project Limitation

The limitations or boundaries of the system are as follows.

1. Database

Develops a database system that acts as a Learning Objects repository to save all the existing and new Learning Objects. Besides, the database is also able to save the related file and information such as user's information, notes, media files and image files.

2. Searching

Develops an Information searching agent that can search information from the Learning Objects repository and from web via Internet search engine such as Google.com.

3. File types browsing.

   Besides generating and viewing LOOOP file, the system also needs to view HTML and XML file. The system is also expected to enable in viewing the picture files (GIF, JPEG, BMP), multimedia files (WAV, AVI) and shockwave flash file (SWF).

4. Learning styles

   Includes a set of tools that enable user to perform traditional learning styles such as highlighting the text and jotting down notes.

5. Communication

   Develops a communication tool for registered user to communicate within each other for discussion purpose.

1.6 Intended Audiences

LOOOP end users are learners who wish to use this system as additional learning material. Learners are able to create new learning contents and managing new and existing learning contents from time to time. In addition, they may share their personal learning contents within LOOOP registered users and perform information searching from the Internet or from sharable learning contents. Besides, LOOOP also provides a communication tool within LOOOP registered users to communicate within each other.

1.7 Methodology

Before software is fully developed, there are a series of predictable steps that can help in creating a high-quality result. The steps are clearly described with Linear Sequential Model. Linear sequential model is sometimes known as classic life cycle or waterfall model. This model is selected as LOOOP software development life cycle because it follows a few simple and clear steps in its software development life cycle. This model

suggests a systematic, sequential approach to software development that begins at the system level and progresses though analysis, design, coding, testing, and support.

Besides, the investigation techniques used in this project are literature review and survey. A literature review is performed on the previous study of related topics from articles, journals, books and conference papers. The related topics that are included in the study are Learning Objects approach, Learning Objects metadata, e-learning standards, object-oriented programming, learning styles and others. A survey is conducted on the students from Faculty of Computer Science and Information Technology, University of Malaya and Systematic College, Petaling Jaya Campus. The survey is done to collect information about the behavior of respondent on learning, the efficiency of currently used learning styles and material, the opinion of ideal learning aids software and others. Altogether, 80 people have given their responds to the survey.

1.8 Expected Output

The output of this project is a client-server application that is run on client computer and retrieves its learning contents from server or from the client computer itself. The overall application contains two parts that include a server-side and a client-side. The purpose of the server-side is performing data processing. For this purpose, an application that acts as a socket is created and located on the server to retrieve and stores the entire learning contents to the database on the server.

At the client-side, a standalone executable application with an ActiveX control is developed. ActiveX control is the main part for the overall system. All the features are developed inside this control. The expected features included in the ActiveX control are Information searching agent, file sharing, sharable learning contents, media file playing, highlight text tool, reader agent and a communication tool. Besides, a dynamic link library

(DLL) file is created for reusability and interoperability purpose. With this file, developers and moderators are able to connect to the learning contents from an external resource.

Thus, the project is also expected to develop Learning Objects that can be used with the system. The Learning Objects can be modified and reused. Besides, a Learning Objects repository is also expected to be designed and implemented. The repository is designed as database and the Learning Objects are tagged by the fieldname of every single database table for easy search.

1.9 Project Schedule

Having a simple methodology to follow in this project development is not enough to complete LOOOP sufficiently. In order to build a complex system, many software engineering tasks occur in parallel, and the results of work performed during one task might have a profound effect on work to be conducted in another task. These interdependencies are very difficult to understand without a schedule. It is also virtually impossible to assess progress on a moderate or large software project without detailed schedule. To achieve this milestone, a work list and project schedules are planned and analyzed carefully based on the scope of the work.

After the entire task for LOOOP has been defined and determined, the next steps are to determine the task logical dependencies. Most tasks are dependent on the start or completion of other tasks, and the task must precede another task unless it has completed the project. Determining the logical dependencies is allowed to determine the overall length of this project and credible estimates of the time required to complete this project.

By using a plan schedule that follows the task logical dependencies, LOOOP can be developed step-by-step and able to complete the milestone or objective on time. A Gantt

chart is drawn after the logical dependencies are defined. Table 1.1 shows the general task dependencies and Figure 1.1 illustrates task logical dependencies diagram.

Table 1.1 General Task Dependencies

Task	Description	Dependencies
T1	Define title	-
T2	Plan and schedule	T1
T3	Literature review	T1
T4	Programming	T2
T5	Writing report	T3
T6	Testing	T4
T7	Binding book	T5
T8	Packaging	T6

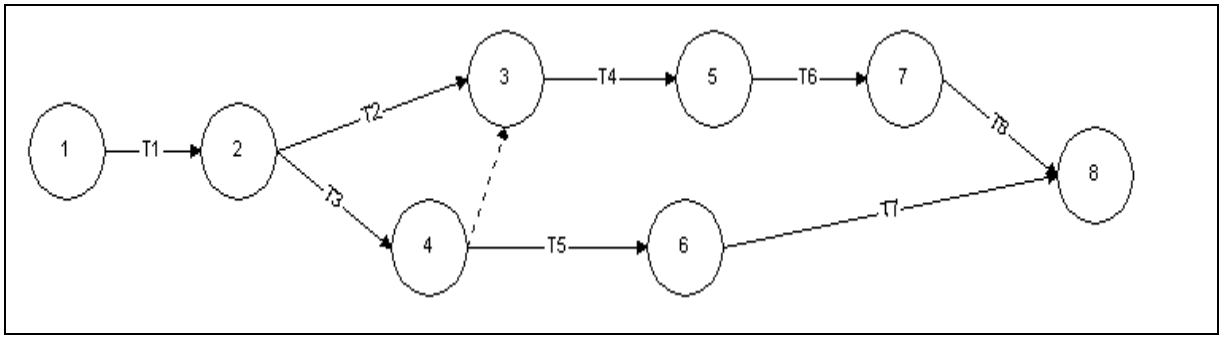


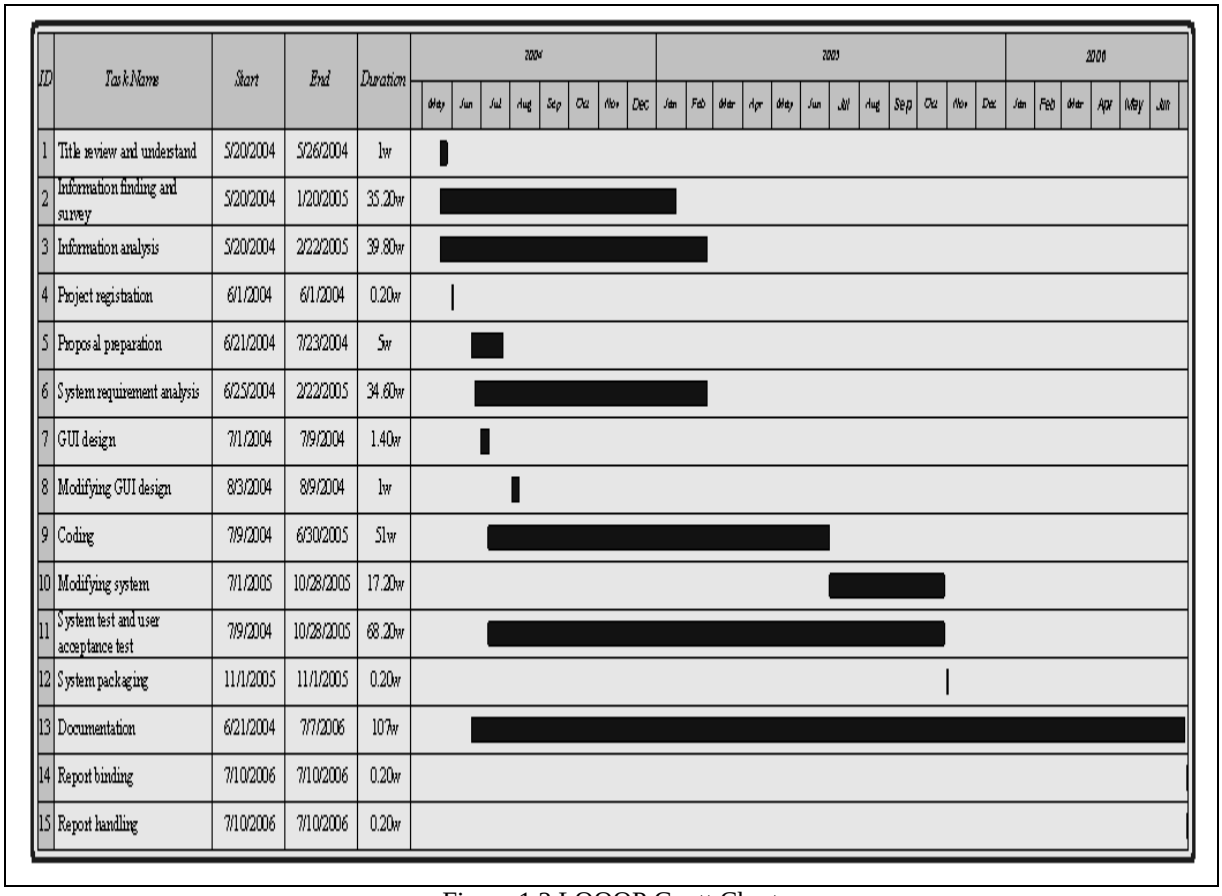
Figure 1.1 Task Logical Dependencies Diagram

In this project, a timeline chart or a Gantt chart is generated. Figure 1.2 illustrates the LOOOP Gantt Chart that has been described. There are fifteen tasks within six groups of activities in system planning schedule. The six groups are system planning, system analysis, system design, system development, system testing and system finish.

In system planning activities, title review and understanding is important to have a better understanding. The understanding ensures project development is always in the project scope and on the way to achieve project objectives. In the system analysis activities, information collected on the data including the definition and the details of Learning Objects as well as some of the similar Learning Objects that have been developed by other

instructional party. At this stage, a survey is conducted. After gathering the information, some analyses are made on the information collected and survey conducted. The results are kept for references for system design level.

In system design activities, this activity is more focused on system architecture, system process flow and user interface design. Beside this, database used in the system is also designed at this level. ERD and DFD are also designed at this level to describe the data flow of the subsystem. These two diagrams are used for implement at the next level, system development.



ID	Task Name	Start	End	Duration
1	Title review and understand	5/20/2004	5/26/2004	1w
2	Information finding and survey	5/20/2004	1/20/2005	35.20w
3	Information analysis	5/20/2004	2/22/2005	39.80w
4	Project registration	6/1/2004	6/1/2004	0.20w
5	Proposal preparation	6/21/2004	7/23/2004	5w
6	System requirement analysis	6/25/2004	2/22/2005	34.60w
7	GUI design	7/1/2004	7/9/2004	1.40w
8	Modifying GUI design	8/3/2004	8/9/2004	1w
9	Coding	7/9/2004	6/30/2005	51w
10	Modifying system	7/1/2005	10/28/2005	17.20w
11	System test and user acceptance test	7/9/2004	10/28/2005	68.20w
12	System packaging	11/1/2005	11/1/2005	0.20w
13	Documentation	6/21/2004	7/7/2006	107w
14	Report binding	7/10/2006	7/10/2006	0.20w
15	Report handling	7/10/2006	7/10/2006	0.20w

Figure 1.2 LOOOP Gantt Chart

System implementation or code generating level is an activity that translates what has been written or designed in the system design level into machine-readable form or reality. System testing is an activity where the system is tested with logical test, functional

test and user acceptance testing. Besides, user acceptance testing is also performed in this level.

Activity in system finish begins only after the subsystem is fully accomplished. The activities include final testing and installer making.

1.10 Chapters Summary

This report consists of nine chapters.

1. Introduction

   This chapter gives an overview to this project. This chapter discuss about the problem statements, project significance, project objectives, project scopes, intended audiences, an overview of methodology use in this project, expected output and project schedule.

2. Review On Learning Objects

   This chapter discusses about the definitions, the features and other related information for Learning Objects. The reviews also include some projects that have been developed by other committee, universities and organizations.

3. Review On Learning Styles

   This chapter discusses about the definitions, types of learning styles as well as the relationship between learning styles and Learning Objects.

4. Methodology

   This chapter discusses about the software development life cycle model used to develop the system as well as the investigation techniques used on data collection.

5. System Analysis

   This chapter discusses about the analysis made on collected data, analysis on survey, the functional and non-functional requirements for this project, the expected system

requirements to run the system as well as the application used to complete this project.

6. System Design

This chapter discusses about the designs of the systems including system architecture, process flow, entity relationship, data flow, database design and the system graphical user interface design.

7. System Implementation And Coding

This chapter gives an overview of the programming languages and technologies used on system implementation as well as the algorithm and coding for several important functions for the system.

8. System Testing And Evaluation

This chapter discusses about the testing performed to the system including the unit testing, integration testing, system testing as and also user acceptance test.

9. Conclusion

This chapter discusses about the project strength, project limitation and project enhancement.

1.11 Summary

This chapter gives an overview to the project, including the problems statements, project significance, objectives, scopes, intended audience, expected outcome as well as project schedule. Problem statements regards to the issues raised in learning and education system. With the stated problem statements, project significance shows the important of this project to be created. After that, the objectives, scopes and intended audience are identified to ensure the project is developed following the right way for the right users. The expected outcome of the project has also been identified as a guideline to develop the

system for this project. Project schedule is designed to ensure the completion of project meets the milestone on time.