UNIVERSITY OF MALAYA

FACULTY OF
COMPUTER SCIENCE
&
INFORMATION TECHNOLOGY

CAL(COMPUTER ASSISTED LEARNING FOR ENGLISH IDIOMS

NAME : TAN YEE LOON*(WEK 98064)*

SUPERVISOR: TEH KANG HAI (EN.)

MODERATOR: RAJA NOOR AINON ZABARIAH

RAJA ZAINAL ABIDIN (PROF. MADYA)

ABSTRACT

CAL for English Idioms is a multimedia educational courseware designed for beginning English learners. It covers a large collection of English idioms and will let the users learn the meaning of English Idioms, and know how to use them. It is interactive and it uses multimedia elements to encourage learning through interaction between the computer and the user. CAL for English Idioms includes three major functional modules: Learning, Interactive and Quiz and Test.

The Learning Module integrated text, graphics, animation and video to aid learning, whereas the Interactive module compliments the Learning by providing interactive games to enhance the user's memory about the Idioms. The Quiz and Test Module however comprises multiple-choice questions that are graded automatically. CAL for English Idioms aims to recover the lack of the teaching aid in school.

CAL for English Idioms is developed using Microsoft Visual Basic 6.0. It is a powerful tool and possesses the basic features to implement the application, such as images, sounds and animations. Further more, Visual Basic has a strong screen design capability that enables the process of interface design, interface editing, and prototyping significantly easier. The rapid application development (RAD) approach was adopted throughout the development of this project.

ACKNOWLEDGEMENT

The report regarding the researches of development of CAL for English Idioms is implemented through the technical and emotional support from many individuals. First and foremost, I would like to extend my most sincere gratitude to Mr. Teh Kang Hai, my project supervisor who has provided me with precious advice, guidance, understanding and support throughout the whole development stage of this report.

Special thanks to Prof. Madya Raja Noor Ainon Zabariah Raja Zainal Abidin, the project moderators for their suggestions and comments.

Utmost gratitude to Mr. Choong Wai Kit, Mr. Chen Hen Wan, Mr. Lim Keat Poh, Miss Chua Hui Boon, Miss Yee Chai Yam and all fellow coursemates, for sharing their knowledge and ideas as well as providing valuable materials throughout the duration of the project. Finally, particular thanks to my family members for their support and understanding for the past few months.

CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1: INTRODUCTION

1.1 Project Overview

Computer Aided Learning (CAL) For English Idioms is an educational multimedia courseware. It integrates text, graphics, animation and audio to deliver information in a more advanced and effective way. In order to become an interactive courseware, which will provide learning through an easy and effective way, the concepts of multimedia is implemented to this Computer Aided Learning (CAL) application.

CAL for English Idioms will include three major functional modules: Learning, Interactive and Quiz.

Tools for the development of this system will include:

- Microsoft Visual Basic 6.0
- Macromedia Director
- Macromedia Flash
- Microsoft Access

1.2 Motivation

The technology of the world today is changing rapidly that the computer now no longer exists merely as an accessory to the civilization, but a an essential part of society. The evidence is obvious, as computer has left its marks everywhere, starting from as small as a word processing application onto projects as large as a space exploration project. In fact, civilization today has reached the stage where almost everything is going on computers, making its influence inevitable.

Undoubtedly, computers too have greatly influenced the field of education. Thus, there exists such application where students will be able to learn by themselves without a teacher's direct intervention. This computer educational courseware is known as Computer Assisted Learning (CAL) application. The term Computer Assisted Learning, CAL, once esoteric, is now becoming common in the educational establishments. CAL is a broader term that includes tutorial, games, simulations and intelligent programs. It also refers to the use of computer as a learning resource to assist student in their tasks. CAL uses computer software, which facilitates the teaching-learning process through interactive text, questions and responses from the computer-input devices and output.

1.3 Project Objectives

The main objectives of developing such Computer Assisted Learning (CAL) courseware are listed as below:

1. To fuse the latest in technology with the best thinking in education to individualized instruction and permit a person to learn at his own rate and up to his full potential.

2. To utilize the knowledge, experience and skill of experts' teachers for the purpose of creating units of instruction, which effectively employ the instructional computer system in combination with other appropriate media to improve and individualize the instructional process.

1.4 About CAL for English Idioms

The objectives to develop the Computer Assisted Learning (CAL) for English Idioms are:

1. User is introduced to a simple collection of English idioms.

2. User learns the meaning of the idioms presented.
3. To promote interest in learning through computer technique.

Scope of CAL for English Idioms

The CAL for English Idioms package contains the following modules:

Content of CAL for English Idioms

1. **Learning Module**

   The system will teach users the meaning of English idioms. The lesson will be divided into smaller parts where user will be given the freedom to stop after each part of the lesson.

2. **Interactive Module**

   Comics and stories will be given to the user to strengthen their memory about the idioms taught in each part of the lessons.

3. **Quiz and Test Module**

   A Quiz of small test will be given to the user in order to examine the user knowledge about the idioms learned.

1.5 System Requirements

1. The minimum requirements to run this system are as below:
   i. System using an Intel Pentium 200 MHz or compatible processor
   ii. 32 MB of memory
   iii. 30 MB of available hard disk space

2. The software which are required to developed the system are:
   i. Windows 95 or higher operating system
   ii. Microsoft Visual Basic 6.0
   iii. Microsoft Access 97
   iv. Macromedia Director 7.0
   v. Macromedia Flash

1.6 Report Organization

Chapter 1 Introduction

This chapter serves as an introduction to the entire report. The objectives, motivation and overview of this project and the content of the CAL for English Idioms are included in this chapter.

Chapter 2 Literature Review

This chapter summarizes the research done and contains information for project development. Mainly, it will consists of discussion on learning what is CAL, the capabilities and components of multimedia application, the planning and development of CAL packages, authoring tools and eventually the review and comparison of other similar packages.

Chapter 3 Methodology

This chapter discusses the use of software prototyping methodology to develop the application.

Chapter 4 System Analysis

This chapter describes the initial system development phase. In this chapter, multimedia elements and development tools that will be used to compose the interactive user interface are defined. Specification of the facilities required will also be verified.

Chapter 5 System Design

This chapter documents the system design process. Selected analysis approach and flowcharts outlines the blueprint. This system will be divided into modules and accomplish by screen display design and navigation ability.

Chapter 6 System Implementation and Testing

This chapter provides information on the actual development of the system. The development environment, programming/scripting language used and testing procedure will be included here.

Chapter 7 Project Evaluation and Conclusion

This chapter will summarize the entire development process. The strengths and limitation of the system developed. The problem encountered will be reviewed with the best possible solution. Besides of that, suggestions for future enhancement will also be included.

1.7 References:

[1] Sommerville, I., *Software Engineering, 5th Edition,* New York Addison-Wesley Publishing Company, 1995

[2] Pressman, R.S., *Software Engineering: a Practitioner's Approach,* New York, McGraw Hill, 1992.

[3] Keller, Arnold, *When Machines Teach – Designing Computer Courseware,* New York, Harper & Row Publisher Inc., 1987

CHAPTER 2: LITERATURE REVIEW

INTRODUCTION

English language is an international language that enables different nationalities of people to interact with each other. To help students to master English language skills is an important goal for children education. In recent years, various types of multimedia applications and courseware have been developed to cater educational needs to deliver information in an interesting, easy and effective way. Learning English language is one of the popular Computer Assisted Learning (CAL) packages in the market. To develop such application, related knowledge has to be established first before going further on the coding part of the program. These include learning what is CAL, the capabilities and components of multimedia application, the planning and development of CAL packages, authoring tools and eventually the review and comparison of other similar packages.

2.1 CAL – An Overview

Innovation occurs when a set of contributing factors – each travelling along its own separate paths for a time – come together and meet at a crossroad. At that crossroad, innovation happens. The development of Computer Assisted Learning, CAL, over the past decade, is one of such an example. The term CAL is now becoming common throughout both the educational and publishing establishments.

What are the once-independent factors that have joined and resulted in CAL and what is the state of CAL today?

1. The first factor is today's educational demand for individualized instruction.
2. Increased federal aid to education provided the dollar lubrication to the development of CAL.

3. The development of today computers, with their time-sharing capabilities and the ability of a centrally-located computer processor to maintain a multiple of students terminals at the same time, was still another necessary factor in the innovative introduction to CAL.
4. The final factor was the development of programmed instruction as a pedogogical theory and technique. Despite the disappointing performance of teaching machines in the 1950's, the basic theory of programmed instruction remained a viable and intriguing possibility to educational theorists and experimenters.

What can CAL do today?

✓ **Tutorial**: CAL is capable today, right now, of stimulating to some the usual teacher-student face-to-face, one-to-one, interchange. This means that one of education's top priorities- individualized instruction – is being met, if not economically from dollars standpoint, than economically from a time-efficiency standpoint by CAL. The computer's electronic capacity to most efficiently manipulate data – both input and output - is responsible for this economy and conservation of effort.

✓ **Drill-and-practice**: This is the bulk of CAL use today. Basically, this means that the computer can simulate, working with the student, homework-type assignments. It can assign appropriate drill and practice, check for accuracy along the way, evaluate the student's potential for the next sequence of complexity of more work, and then assign the next level.

✓ **Laboratory tool**: This use of CAL involves the student using the computer as a computational tool. It is particularly useful for higher levels – high school and college – where the student, working in sciences and mathematics, can manipulate complex data. This provides the student with the opportunity to work with "real"

quantities, rather than conventional textbook models and microcosms of the reality which he will face eventually as a working chemists or mathematician.

- ✓ **Games and simulation**: While still less developed than the previous capacities of CAL today, educational researchers are recently exploring the use of CAL in this field. The student establishes certain parameters in the computer confronts problems based on these parameters and suggests solutions. The computer tells him the probable outcomes of his decisions. This frees the student from the sometimes-arduous task of complex computation, permitting him to see the logic and the overview if the entire process, rather than the detail.

Interactive Learning through Computer

The domain in which computer really can deliver powerful learning experience is one that education largely ignores - GAMES. However this has not escaped the commercial world where game products and arcades are hugely successful. This is because computer games are fun and challenging, and at the same time also help to develop problem solving and decision-making skills.

The Contribution of New Technologies to Learning

- ❖ Specific learning achieved
  - ✓ Development of various intellectual skills
  - ✓ Specificity of what is learned using the new technologies
- ❖ Student motivation
  - ✓ Interest in a learning activity
  - ✓ Time and attention developed to learning activities
- ❖ Relationships of student to knowledge
  - ✓ Developing research spirit
  - ✓ Broader cooperation among individuals
  - ✓ More integrated and better assimilated learning

Computer-Based Instruction Learning

The advantages of using computer-based instruction learning:

- ✓ Own learning styles and preferences
- ✓ Allow student to study what they want at their own pace and up to their full potential
- ✓ Computer easily track student progress
- ✓ Provide detailed analysis of learning accomplished

2.2 Multimedia: Media and Data Streams

People have had a love affair with television for two generations. The invention of moving images, originally in silent movies and later with sound, had a greater impact than a variety of other entertainment sources. Slides projection and movies are also important media for education. As the cliché goes, "a picture is worth a thousand words", full-motion video embedded in documents is worth even more.

Multimedia is probably one of the most overused term in the early 1990s. the field is at the crossroads of the five major industries: computing, telecommunication, publishing, consumer audio-video electronics, and the television /movie /broadcasting industry. As the result, it is no surprise if multimedia finds difficulties in fuzziness in scope, multiplicity of definitions, and non-stabilized terminology, to establish itself as a discipline.

Hence, at the beginning of the 1990s, professionals were asked what multimedia was, most had to admit their difficulty in providing a definition. Professional journals often recognized its fuzziness: " Multimedia is by definition undefined" or " If you asked 10 different people for the definition of multimedia, you will certainly get at least 10 different answers," said G.R. Wichman in December 1991. Applied to more specific environments, the task was not easy: "In the workstation world, its meaning

(multimedia) is nebulous at best," said A. Spedd. When facing a difficulty in defining the term, a possible approach is to look at its terminology.

Definition of Multimedia

The meaning of multimedia can be found by looking in the meaning of the composed word.

Multi- [Latin: much] many; much; multiple.
Medium [Latin: middle] An intervening substance through which something is transmitted or carried on; A means of mass communication such as newspaper, magazines, or television (from American Heritage Electronic Dictionary, 1991).

Hence, we derive the definition for multimedia as follows:

" A multimedia system is characterized by computer-controlled, integrated production, manipulation, presentation, storage and communication of independent information, which is encoded at least through a continuous (time-dependent) and a discrete (time-independent) medium."

In this context, multimedia can be thought of as the combination of text, graphics, sound, animation and video delivered by some form of computer. The components of multimedia include images, hardware and software, video, sound, text and data storage.

Images

- **Vector Graphics** –Vector Graphics are built up from primitives, basic drawing instructions such as line, rectangle and ellipse. These primitives may be grouped together to form objects. They can be produced by many drawing packages such as CorelDraw.

- **Bitmaps and Pixmaps** – Bitmaps, which are also known as raster graphics, are composed of a matrix of dots called pixels. The main advantage of bitmaps is that they can store very large amounts of information. Their main disadvantage is the large amount of space it takes to do this. Paint and drawing packages usually store images as bitmaps. They can be images, which have been scanned in or digitized from photograph, piece of artwork or a video.

- **File Format and Compression** – BAP (Microsoft Windows bitmaps), GIF (**G**raphics **I**nterchange **F**ormat), PCX (PC Paintbrush), JPEG.JPG (ISO standard compression), XBM (X Windows).

Hardware and Software

- Graphic Adapter –PCs
- Scanners
- Digital Cameras
- Photo CD
- Monitors

Video

- **Analogue Video** – Video camera, video disc/laser disc, video overlay boards
- **Digital Video** – avi, MPEG compression.
- **Animation**

Sound

- **Midi** – **M**usical **I**nstrument **D**igital **I**nterface.
- **Digital** – Digital sound is sampled, that is at regular intervals a sample of sound is taken and stored.
- **Capture and Playback** – Sound card, speaker / headphones.

Text

- Make sure the text is legible at the size it will be viewed at
- Do not use a lot of different font typefaces.
- Adjust spacing if necessary (line spacing, kerning).
- Try different colors to make more legible or stand out.
- For heading, try other effects, such as drop shadows or making the text curved.
- Sentences in mixed case are easier to read if compared to those that are in just capital letters.

Data Storage

- **Hard Disks** – Multimedia requires large amounts of disk space, and a hard disk should be at least 200MB (more for development) for a standalone machine.
- **CD-ROM** – the CD was originally developed to deliver audio data, this standard was called the Red Book standard. CD-ROMs (**C**ompact **D**isk **R**ead **O**nly **M**emory) were then developed to store a range of data in digital format. A compact disk can store about 650M of data. [8]

2.3 Planning and Development of CAL

Creating a multimedia application can involve a great deal of time and resources. It is very important that before starting any actual coding everything has been carefully planned – what are you trying to achieve with this application, what resources are available, what skills are available and so on. A structured approach throughout the planning, development and testing of an application can help to save time and contribute to better CAL.

Content

Initially one should produce an outline of the course, with a rough description of how the user interface will appear. This will enable one to decide what content resources he/she will be needed. One should probably provide text, possibly from existing course notes, but additional material such as images, animation, video and sound may need to be created.

Flow Charts

Before starting to code, one should expand his/her outline. There are many conventions for drawing correct flowcharts, but all that is really required is a diagram showing the main structure of the program. Drawing the flowcharts will encourage one to be clear about the structure, for example what happens if a student had chosen an incorrect answer to a question, can they leave the program part way through and so on.

Prototyping

A prototype is a partial implementation of the final application. This enables one to check that the structure of the application will work and to finalize decision about screen layout. Once one has created the prototype, he/she should get other people to use it to get the feedback. The more problems that can be ironed out at this stage, the easier the subsequent coding and testing cycle will be.

Programming

Finally, all requirements are satisfied and it is time for the programmers to start to create the application.

Testing and Evaluation

The programmer will do the initial testing of the program and once he/she feels satisfy with it, it should be given to another user to test. The next stage is to test with a small group of students, who will probably have already covered the material in some other

form. The feedback from them should then be reviewed, either interviewing them or providing questionnaires, or from their own notes. The information obtained can then be used to improve the program further before it is widely available.

2.4 Authoring Tools

There is a wide variety of authoring tools available, ranging from traditional programming language to special designed menu driven tools. Programming languages such as Pascal and C require skilled programmer in order to write a good application. Authoring languages also require coding, but the language has been specially written with the aim of producing CAL, so the coding is much simpler. These are known as scripting languages. Authoring systems are generally menu driven and the code is created automatically. In practice most authoring system also have a scripting language, which can add extra facilities.

Author Tools Reviews:

Visual BASIC by Microsoft

Microsoft Visual Basic was the first truly general-purpose, easy to learn and use, graphical Windows development tool on the market. By enabling anyone to create professional-looking Windows applications it became extremely popular and is still one of the most widely used development tools around.

Visual Basic is a radical departure from previous forms of Basic Insofar as it allows many parts of an application to be created without code, purely by placing controls, such as buttons and dialogues, on a form and changing the properties associated with them. Another difference from 'normal' Basic is that Visual Basic applications can be compiled, although the environment runs in interpretive mode. The Professional edition

of Visual Basic comes with a library of custom controls to handle such functions as MCI control and communications, and is the version necessary to create multimedia applications, as the 'basic' Visual Basic has no multimedia functionality.

One of the major advantages of Visual Basic is that you can get started away. It is a boost to confidence when you can create something that works within an hour of installing a package, and it is quite produce a form with considerable functionality purely by using the custom controls and without any coding. The learning curve steppens somewhat when coding is required, although as the code is dispersed amongst forms, controls, and modules it is broken up into digestible chunks which can attached to identifiable functions like a command button, or a dbl_click event. This is less frightening for the non-programmer, who is not faced with a long mind-numbing programming listing.

Visual Basic's main strengths lie in its flexibility, ease of use, and large user base. Whilst "third-party add-ons" can be obtained that will add hypertext and text-handling capabilities.

Visual Basic introduces a variety of features that make it easier for you to create powerful, flexible applications. For example, you can load multiple projects into a single session of the programming environment, work with Windows registry settings, or selectively compile certain parts of your program. Beyond the fundamentals of writing code, Visual Basic provides a variety of language elements that enhance your code. The last four topics in this chapter discuss four of these language elements: user-defined types, enumerated constants, arrays, and collections.

- Working with Multiple Projects

You can create many applications by working with a single project. However, as your applications become more complex, you may want to work with multiple projects in the

same session of the programming environment. For example, you may want to use one project to build an application's executable file, and a second project to serve as a "scratch pad" for testing code before you add it to the application. You can add a new or existing project to your current editing session by adding it to a *project group*. You can then save the project group and work with it in subsequent editing sessions. You can open either the project group or an individual project in the project group, or add the project group or its individual projects to another project group.

- Using Condition Compilation

Conditional compilation lets you selectively compile certain parts of the program. You can include specific features of your program in different versions, such as designing an application to run on different platforms, or changing the date and currency display filters for an application distributed in several different languages.

- Working with Resources Files

A resource file allows you to collect all of the version-specific text and bitmaps for an application in one place. This can include icons, screen text, and other material that may change between localized versions or between revisions or specific configurations.

- Working with Templates

Visual Basic provides a variety of templates for creating common application components. Rather than creating all the pieces of your application from scratch, you can customize an existing template. You can also reuse custom components in multiple applications by creating your own templates

- Working with Command Line Switches

Command line switches provide a way to control how Visual Basic executes. Using command line switches, you can start an instance of Visual Basic and run a specified

project, make an executable file or dynamic-link library, or specify a string to be passed to the Command$ function.

- Compiling Project to Native Code

If you have the Professional or Enterprise edition of Visual Basic, you can compile your code either in standard Visual Basic p-code format or in native code format. Native code compilation provides several options for optimizing and debugging that aren't available with p-code.

- Creating Own data types

You can combine variables of several different types to create user-defined types (known as *structs* in the C programming language). User-defined types are useful when you want to create a single variable that records several related pieces of information. You create a user-defined type with the Type statement, which must be placed in the Declarations section of a module.

- Using Collections as alternative to arrays

Although collections are most often used for working with objects, you can use a collection to work with any data type. In some circumstances, it may be more efficient to store items in a collection rather than an array. You may want to use a collection if you're working with a small, dynamic set of items.

- The primary advantage of VB over other tools is it's integration with the Windows environment. There are number of built-in and third party control (OCX and ActiveX) that make multimedia integration easy and effective.

- These add-on component include:
  i) Graphical tools for loading multiple file formats and for providing various effects (fade in/out, dissolves).

ii) Audio tools for playing wave and midi files.

iii) Digital video tools for playing audio-video interleaved and MPEG files.

- The downside for multimedia application is the fact that VB is designed to be a programming environment and does not easily lend itself to the temporal sequencing or page-oriented features of other multimedia authoring tools such as Macromedia Director.

- There are generally two approaches for combining VB with multimedia
  i) Add multimedia elements such as graphics, audio, and video to more classic application.
  ii) Build multimedia-authoring tools in VB that will be used to create multimedia products.

In conclusion,

Pros:

- Easy to learn and use
- Inexpensive
- Vast amount of tutorial and support material available in books, magazines and online
- Applications compiled to executable form, and there are no restrictions on distributions

Cons:

- No hypertext capability
- Poor at text handling
- Required a lot of coding in a daunting programming language

KnowledgePro for Windows (KPWIN)

KnowledgePro for Windows (KPWins) is a fourth generation programming language (4GL). Produced by Garden Inc., who advertise it as "a tool for developing fast, runtime free Windows applications... whatever your level of expertise." It is available in three forms:

- KPWin – The basic KnowledgePro interpreter
- KPWin Gold – As above, with the royalty-free runtime system
- KPWin ++ - As Gold, with a C++ generator

Although undoubtedly less difficult to learn and use than C or Pascal for Windows KPWin is nevertheless a Windows programming language which attempts to retain a lot of functionality and close control over the Windows environment. The developer is not shielded from the Byzantine complexities of the Windows environment and so KPWin has a steep learning curve in comparison to the other systems, particularly if the author/programmer is new to Windows programming.

The history of KnowledgePro is as an object-oriented, list handling, hypertext, and expert system language, which originally ran in Dos. KnowledgePro for Windows was released in 1990 and was one of the first 'friendly' Windows languages. As a generla-purpose Windows development tool it seems to be positioned between C++ and Visual Basic, and is certainly a product to consider for a language that combines low-level control over the Windows environment with high-level ease of coding. It was built for list and text handling, particularly hypertext, and is hard to match as a niche product in this field. It is certainly a lot easier to use than C or Pascal for Windows yet it still retains considerable functionality and flexibility. It has to be said, also, that it is an excellent introduction to Windows programming and Object-Oriented Programming – not painless, to be sure, but far less painful than C or Pascal.

We can conclude that using KnowledgePro for Windows (KPWIN) provides the following advantages

- Using KPWin ++ and a C++ compiler, applications can be compiled to executable form.
- Excels at text and list handling, and Hypertext
- No runtime restrictions
- Good introduction to Windows programming

However, it also contains a few disadvantages:

- All functions require coding, although this is also a pro insofar as there is no 'hidden code'
- Poor screen designer
- Moderately difficult to learn
- Little tutorial material available
- Fairly expensive if you want to produce compiled applications

Authorware Professional for Windows (APW)

Authorware is perhaps Macromedia's best-known product aside from Director and is widely used. It's an iconic tool specially designed for the development of educational software and training applications by non-programmers. Each of the eleven icons available to the workspace has a particular function, like display or decision, and the development process involves dragging icons from the toolbar on to a flowchart which controls the program flows.

APW was designed for the non-programmer, requires no coding from developer, and is very easy to learn and use, particularly from the multimedia viewpoint. APW applications tend to be full-screen and with little Windows look-and-feel.

Macromedia make a strong selling point of APW's dual platform capability – there is Mac and PC versions of Authorware – but portability is not entirely trouble-free. Although commercial distribution of finished APW applications off-site is now royalty-free the developer has to sign a long and daunting agreement containing a number of conditions and regulations.

In conclusion, the advantage of Authorware Professional for Windows (APW) has the few following advantages:

- Easy to used due to its non-programmer environment and it does not required coding
- Its dual platform capability – there is Mac and PC versions of Authorware
- Good Internet product support via Macromedia Home Page and listserv list.

However, APW too has a few disadvantages:

- Conditions attached to commercial runtime distribution
- Expensive
- Slow execution compared to compiled applications
- Poor screen design capability
- Little Windows look-and-feel

Toolbook

A popular development tool, Asymetrix Toolbook uses a book and page metaphor, akin to Hypercard's stack and card idea. Indeed, it has such a Hypercard look and feel that it used to be referred to as 'Hypercard for the PC'. Toolbook has its own programming language, OpenScript, which is very similar to Hypertalk. (Curiously, despite its obvious similarity to Hypercard, there is no Mac version of Toolbok and no inter-platform portability.). It's a more general-purpose development tool than Visual Basic, Icon-Author, and Authorware, as it can be used to produce not just courseware but also "heavy-duty" applications such as databases. It is particularly suited to text handling and is ideal for applications with large amounts of text.

Like Visual Basic, the developer 'draws' objects – such as buttons and fields – on a "page" or "background", the behavior of which is controlled by code ('scripts') either attached to the object or placed further up the "object hierarchy". This approach is very flexible and allows the developer a lot of scope, but also makes the package more difficult to learn and to use than, let's say Authorware, because the developer has to learn not only how to code but also where to place the code.

How easy or difficult the user finds Toolbook will very much depend on their previous experience. Hypercard developers will be immediately familiar with the environment and will be able to produce meaningful work very quickly. Windows-based programmers will require a little adjustment to the peculiarities of OpenScript, but before long they will also be producing good work. Completely novice developers, or developers used to iconic developments tools, will face a learning curve which is not made any shallower by the lack of tutorial materials available for the packages. However, Asymetrix have attempted to ameliorate this situation by producing the Toolbook CBT Edition which, according to Asymetrix, "includes all of the power and features of Multimedia ToolBook 3.0, plus an expanded feature set tailored to the specific needs of courseware authors", and is reputedly easier to learn and use.

In conclusion,

Pros:

- Easy to use and learn for Hypercard developers
- Excellent Internet product support, both via Asymetrix Homepage and listserv list
- No distribution restrictions
- Inexpensive compared to iconic tools (although dearer than VB or Delphi)
- Easy screen design

Cons:

- Moderate learning curve for novice developers – lots of coding required
- Little tutorial material available
- Slow execution compared to compiled applications

Director 7.0 by Macromedia

This is the authoring tool that will be used mainly for this courseware. It supports presentation of audio, graphic, text, animation and video. It uses many icons to represent different characteristics and function. This tool allows the developer to import images, sound, movie and animation from an external source.

It's an iconic tool specifically designed for the development of educational and training application by non-programmers. Director was designed for the non-programmer, requires no coding from the developer and is very easy to learn and use, particularly from the multimedia viewpoint.

In conclusion, Director by Macromedia has a few of the following advantages:

- Its programming language used scripting Lingo in building the multimedia application. This enable the interaction between graphics, audio, video, animation and others multimedia elements because Lingo has its own built-in-function with the instruction similar to English Language.
- User friendly interface which make the combination of multimedia elements more easily.
- This authoring tool also has the facilities to edit sound, images and 3-dimension illustrations that are needed to enhance the multimedia courseware.
- Its screen design such as button and toolbars which similar to the Windows program.
- Its ability to support all kind of audio, video and image graphics files.
- Director is cross-platform software. This means that the application developed using Director will be able to run in Windows and Macintosh environment without any conversion.

It also contains the following disadvantages:

- Slow execution compared to compiled application.
- Large in size of the developed application.
- Fix screen size. Thus, need to adjust the screen size during the development of the application.

Microsoft Access

Access is such a rich and powerful application that most people does not know where to begin when they start using it. Access makes it easy for users – even beginners – to work with databases. You can create tables, edit data, and use queries to find the data you want with very little effort, and Access includes wizards which can do the work of designing data entry forms, reports, and mailing labels for users. Access also makes it easy for developers to create applications. It includes on entire programming language,

Visual Basic for Applications and its interface is so powerful that developers can create many custom applications with programming.

Below states the features of Microsoft Access that can be used by developers using Visual Basic

- Microsoft Access is a stand-alone relational database product. Access includes two features that can be used by Visual Basic programmers – Data Access Objects (DAO) and Microsoft Jet. The Jet Database engine is the data manager on which Microsoft Access is built. JET can be manipulated by DAO using VB code or with the intrinsic data control using no code
- The Visual Basic 6.0 intrinsic data control takes advantage of DAO to provide even simpler data access using bound controls. As we have already seen, the DBList, DBGrid and DBCombo controls, when bound to an intrinsic data control, can provide nearly all of the DAO functionality without even having to write any code
- VisData (which happens to be written in Visual Basic) is a program that provides a graphical font end to create and manipulate Access database. So VisData is a limited font read to Access tables. VisData communicates with the database by using DAO and Jet

Photoshop by Adobe

This software is an advance image processing and creating program. It is suitable to be used by professionals who place the importance on creativeness. Photoshop also allows an image like clip-art, scanned photo and image captured from video device to have its color modified and enhanced.

ACDSee by ACS System

It is a very useful as graphics file viewer and browser. I t supports a large range of file format to be viewed by the user. The file format includes .BMP, .GIF, .JPG, .TGA, .TIF, .PNG, .WMF, and .PSD.

2.5 Shareware Reviews

Review on other available multimedia application gives a rough idea on how a similar application should be developed and how the user interface should look like. However, there is still no similar software available regarding only the mammals in the market yet. However, there is some software developed as a tool to help the learning process of the student.

The following is a list of similar packages of shareware reviewed:

1. Pakej Pembelajaran ABJAB Bahasa Melayu (TUNAS)
   - A package on learning Malay character
   - Its disadvantage is that it takes up quite a large amount of storage and only can be run on Windows 3.1 and above

2. Pakej Pembelajaran Algebra (PPA)
   - A package on learning Algebra
   - Its advantages are interactive, user-friendly and testing on user's understanding
   - Its disadvantage is the restriction on using keyboard

3. Pakej Pembelajaran Berinteraktif Trigonometri (TRIGMET)
   - A package on learning Trigonometri
   - Its advantages are interactive and user-friendly with colorful screen

- Its disadvantages is the restriction on using keyboard

4. RPJ Multimedia – Calvin CoolBee's Spelling Arcade
   - It is developed to train children's spelling in four parts: contents, practice, game and competition.
   - It advantages are colorful and enjoyable with music which are able to attract the children's attention

5. Scrambled Word Quizzes
   - More interesting way to learn vocabulary

6. Scramble
   - Fix the component to form the real object and hence remember the name of the object

Comparing Shareware

One of the software is multimedia software for student to learn about a language, " *Multimedia Language System" by Syracuse Language System (1994).* The following are my point of view toward the software package:

Advantages:

- Flexible

  Its friendly user interface enables user to use the package anytime without the supervision of adult.

- Multimedia Elements

  The package used interesting images and animation, which will attract the interest of the children.

- User friendly

  The explanations given were simple and easy to understand.

- GUI

  This package used colorful and interesting GUI. The icons were represented with the object itself. Hence, the children can easily choose the object they want by clicking the particular icon.

Disadvantages:

- Lack of background music and sound

  The package used limited sound and background music, which might cause the package to be less interesting to the children.

- Limited language teaching

  The package only has a few module of language teaching. Hence the user only able to learn limited sentences from the package.

Besides the above mentioned package, another similar package that I found was a multimedia from *Kam Kiew Loong (Universiti Malaya, 1999) titles Birds Encyclopedia for Children (BEchild).*

My opinions regarding this package as below:

Advantages:

- Complete module for learning process

  This package has 3 main modules, which can be divided into Learning, Interactive Games and Quiz. Children will be taught all about birds from their types, lifecycle, song and video.

- User friendly

  The package uses interesting and colorful images and multimedia elements, which mainly attract the interest of the children. Besides, interesting icons and music also had been used to draw the attention of the children.

- Multimedia elements

  The complete multimedia elements enable the children to understand birds in depth in an interesting way.

Disadvantages:

- Lack of references to the parents and teachers

  The package did not have any references to the parents and teachers, which will be very useful for them to explain more about birds to their children whenever, the children having any doubts.

2.6 Conclusion

After having a look at all the required materials, it gives me a guideline and clearer views on how to produce a multimedia CAL package. Initially the outline of the content should be produced with a rough description of how the user interface should appear. The content should be in an interesting method to catalyze the learning process as well as some games to make the learning process more enjoyable and effective. Expand the outline by producing a flow chart and develop the prototype to test if the structure of the application will work is a must in order smoothen the design process. Director and Visual Basic would be used as the authoring tools and the additional materials such as images and animation should be produced first before really going into coding part of the program. Finally, start to create the desired application and constantly test the program to clear any problems or inconsistencies within the program.

2.7 Reference:

1. Joel A. Roth, CAL – An Overview *Computerized Educational Technology*, vol. 1, pp 5-11, 1977.
2. Wichman, G.R., Software Without Borders, *Sun World*, vol. 4, no.12, December, IDC Communication, 1991.
3. Speed, A., Doing the Multimedia Mix *Sun World*, vol. 4, no.12, December, IDG Communication, 1991.
4. Andleigh, Prabhat K., *Multimedia System Design*, New Jersey, Prentice Hall, 1997
5. Blattner, Meera M., *Multimedia Interface Design*, New York, ACM Press, 1992.
6. Hillman, David, *Multimedia Technology and Applications, Chapter 9 – Authoring Tools*, Delmar Publishers, 1997.
7. Riley, Fred, *CAL Production – The Role of Authoring Systems*, Scaborough, CTI Centre for Modern Languages, University of Hull.1996
8. MSDN Library Visual Studio 6.0
9. Geoffrey, R., Heimy, F. and James, P. *Using Computers in Teaching Foreign Languages*, Englewood Cliffs, Prentice Hall, Inc., 1995.

CHAPTER 3: METHODOLOGY

3.1 INTRODUCTION

Computer Assisted Learning (CAL) For English Idioms Package is developed using the software prototyping methodology. The emphasis is on trying out ideas and providing assumptions about the requirements, as well as the feasibility of the suggested system. The reasons why this strategy is adopted is explained as follow:

1. A multimedia courseware package has a relatively small amount of background processing and these systems tend to emphasize on the user interface and data flow within the program. Thus a prototyping approach would best suit the development of such a system.

2. Experiments may be carried out to determine the appropriateness of various design approaches and ideas.

3. Prototyping provides a tangible system to work with instead of abstract specifications that may be difficult to imagine and visualize. This provides the developer with useful feedback before too much time and effort is wasted on screen design and concepts that will not work successfully.

4. Iteration is an integral feature of the prototyping approach. Through iteration, the development stages of design, implementation and evaluation are perform not just once, but as many times as necessary in the given time frame for development. This increases the likelihood that the final product will be of high quality.

Prototyping means building a small version of a system, usually with the limited functionality, that can be used to

- Help the user to identify the key requirements of the developed system
- Demonstrate the feasibility of a design or approach

Often, the prototyping process is iterative: we build a prototype, evaluate it, research how the changes on the prototype might improve the product or design, and then build another prototype. The iteration ends when we have a satisfactory solution to the problems at hand.

Prototyping is a process that enables the developer to create a model of the software that will be built. This prototype model consists of six steps as shown in Figure 3.1

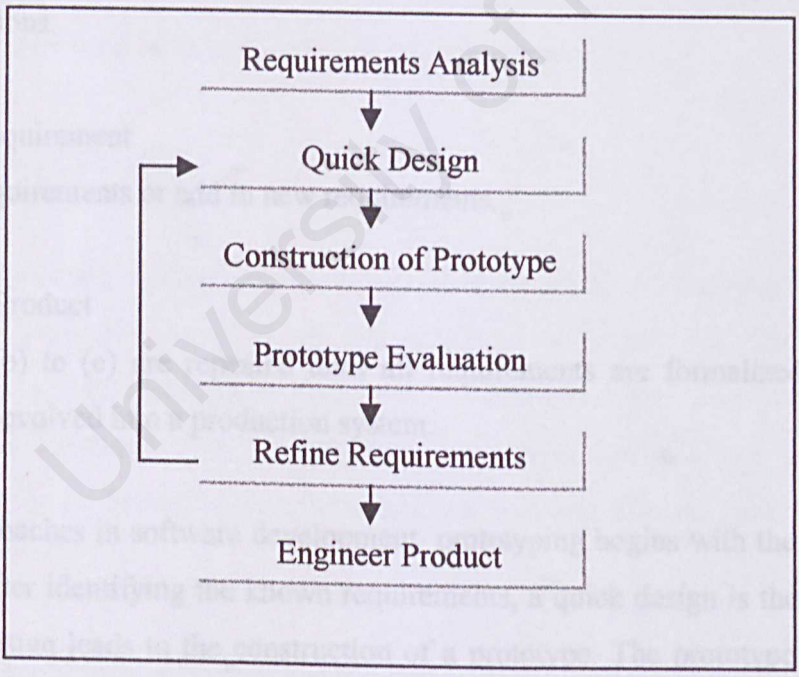


Figure 3.1 Prototyping Model

a). Requirement Analysis

To carry out research and analysis, and to develop an abbreviated representation of the requirements.

b). Quick Design

Quick design on software system function which may be enhance in later phase.

c). Construction of Prototype

Prototype software is created, tested and redefined.

d). Prototype Evaluation

The tested version of the prototype is presented to the user to test and suggest modifications.

e). Refine Requirement

Justify requirements or add in new requirements.

f). Engineer Product

Activity (b) to (e) are repeated until all requirements are formalized or until the prototype evolved into a production system.

Like all approaches in software development, prototyping begins with the requirements gathering. After identifying the known requirements, a quick design is then formulated. The quick design leads to the construction of a prototype. The prototype is tested and evaluated to refine the requirements. A process of iteration occurs until all requirements are formalized or until the prototype has evolved into a production system.

3.2 Prototyping Requirements

There are times when we are uncertain of exactly what is required or needed. The Requirements Analysis may yield a "wish list" of what the users would like to see, but it is not clear whether the list is complete. In other cases, users know what is needed or wanted, but we are not certain whether the users' problem has a feasible solution. There are two approaches to prototyping:

- ***Throw-away prototype***

  A throw-away prototype is software developed to learn more about problem or explore the feasibility or desirability of possible solutions. It is exploratory and not intended to be used as an actual part of the delivered software.

- ***Evolutionary prototype***

  An evolutionary prototype is developed to learn about the existing problems and form the basis for some or all the delivered software. For example, several evolutionary prototypes can be built to let the users, who are not certain about what they want, to choose the preferable options. Once one interface is chosen, the prototype can be developed into the actual interface and delivered with the rest of the product.

Both of the mentioned techniques are sometimes called rapid prototyping because they build sections of the proposed system to determine the necessity, the desirability or feasibility of requirements. The term "*rapid*" distinguishes the prototype from that used in engineering, where a small system or subsystems is built after the design is complete.

In rapid prototyping, choices are evaluated before design is created; the purpose of the rapid prototype is to help us understand and design on a successful final design.

3.3 Prototyping Designs

Prototyping offers many of the same advantages in the design stage that it did during the Requirement Analysis. A feasible prototype allows us to find out in the design stage, whether the solution we propose will actually solve the problem at hand. Thus, a prototype encourages us to communicate with the users to explore areas of uncertainty that arise when we think about how to design a solution. In this way, we resolve many issues before coding begins, and we avoid the creation of many more problems during the testing phase.

If a prototype is intended only to demonstrate feasibility or desirability, we frequently discard the prototype and build the actual system from scratch. That means this throw-away prototype is means to be discarded; its development is intended only for the identifying of feasibility or some particular characteristics in a large system. However, recent software engineering researches have encouraged the use of rapid prototyping to build and save parts of the prototype for use in the actual system. In this light, rapid prototyping incorporates specification, design, implementation, and testing in ones step.

3.3 Reference:

[1] Pressman, R.S., *Software Engineering : a Practitioner's Approach*, New York, McGraw Hill, 1992.

[2] Keller, Arnold, *When Machines Teach – Designing Computer Courseware*, New York, Harper & Row, Publisher Inc., 1987

CHAPTER 4: SYSTEM ANALYSIS

Analysis and design methods allow developer to build models and examine them for effectiveness, completeness and consistency. Despite of that, developers can also readily reuse the requirements and design components, in order to increase the productivity and quality with relative ease. Different types of tools and techniques address different aspect of a problem, and developers need to identify the modeling primitive that will allow them to capture all important aspects of a problem with a single technique.

4.1 CAL Application Development Phase

The development process can be divided into 5 general phases. They are Analysis Phase, Design Phase, Development Phase, Implementation Phase and finally Evaluation Phase. Though these phases can sometimes overlap and be interrelated, they provide a dynamic and flexible guideline for developing an effective and efficient CAL.

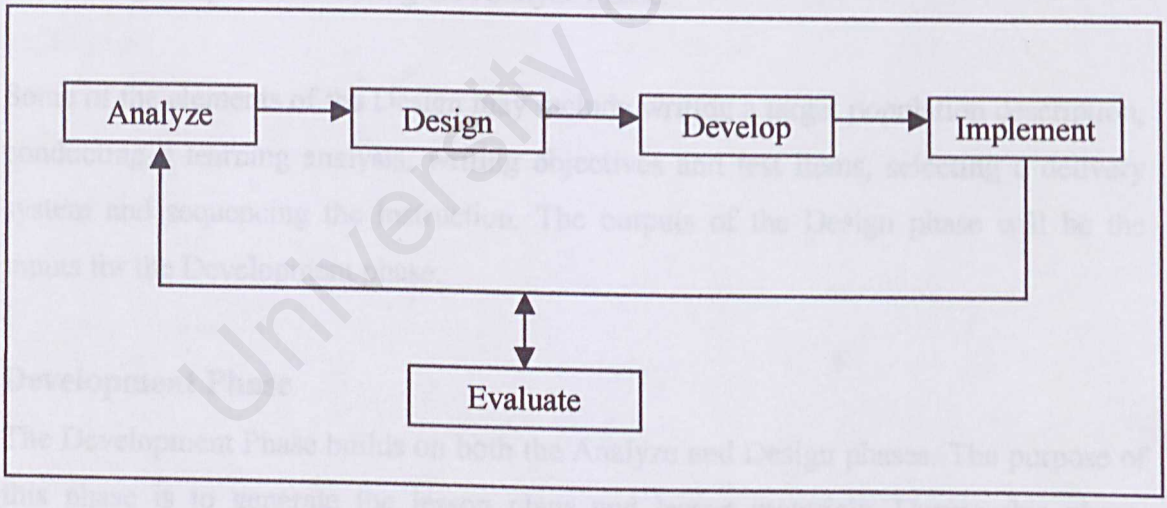


Figure 4.1: CAL Development Phases

Analyze Phase

The Analyze Phase is the foundation of the development process. During this phase, problems must be defined, followed by identifying the source of the problems and sorted out the possible solutions.

The Analyze Phase may include specific research techniques, such as requirement analysis, job analysis and task analysis. Output of this phase includes the CAL goals and a list of functional tasks. The output of this phase will be used as the input of the Design Phase.

Design Phase

The Design Phase involves using the outputs from the Analyze Phase to plan a strategy to develop CAL. In this phase, the best methodology or approach must be outlined to fulfill the goals protected during the Analyze Phase.

Some of the elements of the Design may include writing a target population description, conducting a learning analysis, writing objectives and test items, selecting a delivery system and sequencing the instruction. The outputs of the Design phase will be the inputs for the Development phase.

Development Phase

The Development Phase builds on both the Analyze and Design phases. The purpose of this phase is to generate the lesson plans and lesson materials. During this phase, structure of instructions will be developed. Besides that, media that will be used in this CAL application and supporting documentation will also be developed.

Implementation Phase

The Implementation Phase refers to the actual delivery of the CAL application. The purpose of this phase is to produce and deliver an effective and efficient system. This phase must be able to promote the students' mastery of objectives.

Evaluation Phase

Evaluation should actually occur throughout the entire development process – within phases, between phases and after implementation. Evaluation may be formative or summative.

Formative Evaluation is ongoing during and between phases. The purpose of this type of evaluation is to improve the CAL application before the final version is implemented. Summative evaluation usually occurs after the final version of instruction is implemented. This type of evaluation assesses the overall effectiveness of the CAL application.

Steps and Definition	Tasks	Output
Analysis The process of defining what is to be learned.	- needs assessment - problems identification - prerequisite learning	- learner profile - description of constrain - needs, problems statement
Design The process of specifying how it is to be learned.	- write objectives - plan instructions - identify resources - design assessment instruments	- measurable objectives - instructional strategy - prototype specifications
Development The process of authoring and producing related materials	- work with producers and developers - develop program - develop practice exercise - develop test items - create learning environment	- storyboard, lesson script - computer-based instruction - feedback instrument - computer-mediated instruction - collaborative learning - web-based training
Implementation The process of installing the project in the real world context	- instructor/ student training, one-to-one - pilot training	- user comment - evaluation data
Evaluation The process of determining the adequacy of the learning	- record time data - interpret course review question results - survey trainee and supervisors - revise activities	- recommendations - evaluation report - revised training materials - revised prototype

Table 4.1 CAL Development Process

4.2 Analysis of the System

Traditionally, students in Malaysia accept their early education mostly in books and pencil. During lesson, teachers will prepare extra teaching materials besides textbooks, such as cardboard with colorful pictures, as a medium to deliver information to students and to create an interesting learning environment to them. At home, students may also do their revision alone with textbooks, which at most of the time seems quite boring. If, there is another alternative way for them to learn or revise their learning in school previously, it will make the learning and revision process more interesting and effective for them.

A new system is to be built to cater for the needs stated above. Once the main problem is identified, the scope of the system can also be determined. Thus, the content of the package should contain the following module:

- Learning Module
- Interactive Module
- Quiz and Test Module

The system should provide practice and reinforcement, which is both student- and teacher-friendly. The exercises provided are geared towards developing the skills of learning and using English idioms. Besides, the element of game is integrated in the system to make the learning more interesting with fun.

Due to the fact that most of the target users are at the beginning stage of learning English, the system is expected to display more portion of images than texts. It should be easy to use to enable faster and effective learning rather than burden them with the difficult procedure of using it. Instruction should be simple and clear for the exercises, which aim to help students in learning the English Idioms.

As most of the home computer users are using Microsoft Windows 95 as their operating system, the learning package that is built should be able to run on such platform. Since the package is a multimedia program, the hardware requirements should include speakers, sound card and VGA card.

4.3 Analysis of Programming Technologies and Languages

Most academic CAL these days has been and is being developed using authoring tools rather than programming languages. Using authoring packages such as Toolbook and Authorware, developers can easily create sophisticated applications without the need to be an expert programmer. However, the plethora of tools available can make the task of selecting the right tool to develop CAL problematic.

This section examines development tool selection criteria in general, then goes on to take a comparative look at the strengths and weakness of the tools used most extensively, in particular Authorware, Director and Visual Basic.

One of the most important choices to be made during the process of software development is that of which software tool should be used. For developers in the Windows environment, this choice is particularly difficult because of the bewildering plethora of authoring systems and programming language on the market, all of which are advertised as the definitive development tool, "tomorrow's software standard", "the ultimate hypermedia tool", "the professional's choice" and so on.

An authoring tool can be defined as 'an application development environment for non-programmers'. This is not to say that only tools which require no coding from the author can be deemed as 'authoring tools'. This would rule out popular tools such as Toolbook or Guide, which uses its own programming languages. The main purpose of an authoring tool make ease to non-programmer as he/she can learn to use such a tool in short space

of time (relative to that taken to learn a conventional programming language, such as C or Pascal) and use it to produce high-quality applications.

There is literally hundreds of authoring tools on the market so the prospective software has to use stringent criteria to window down the choice. Many tools occupy a niche, insofar as they are specially designed to create certain types of application. For instance, Question Mark is used to produce drill-and-practice exercise and tests and would certainly not be the tool of choice for writing, for example, a hypermedia courseware application. Rather than explore every specialist niche application, this section focuses on general-purpose authoring tools capable of creating a wide range of applications, in particular CAL applications. General-purpose tools require more work from the author than niche tools, and in particular require that the author acquires application design/programming skills, but this is compensated for their flexibility.

4.4 Choosing A Development Tool

Sometimes the choice of tool is already made by circumstances. You may have a good Visual C++ programmer available, in which case it would make little sense to use a tool such as Authorware. Your site may have a site license for ToolBook, in which case it would be preserve (and expensive) to use, say, Visual Basic. Perhaps the tools forced on you by such factors is not, objectively, the best tool for the job, but unless it's completely unsuitable it would be unwise to spend money and time on a new tool. Many prospective authors, however, will be faced with a choice, where they need to use objective criteria to judge the merits and demerits of competing tools. Amongst the criteria that could be compared are:

- **Expertise of the Developer**

The degree of technical expertise possessed, or which can realistically be acquired, by the developer is fundamental. If the developer has used a particular tool in the past then time may be saved by using it again, even if it is not as technically suitable for the job as other tools do. Also, if the developer has programming expertise an authoring environment may be too limiting and frustrating, in which case a mainstream programming environment such as C++ might be called for.

- **Suitability**

Can the environment do the job? Does it possess the features necessary for the implementation of the courseware? Some authoring systems are designed for particular functions and are correspondingly weak in other areas (although the advertising always maintains that the package is an all-round application developer.)

- **Ease of Interface Design**

Does the tool have a screen design capability? If so, how easy is it to use? The majority of modern CAL applications are developed for graphical environments such as Microsoft Windows and the Macintosh, where the application interface is of crucial importance. Most modern development environments allow the developer to 'draw' and manipulate objects – buttons, fields, dialogues, etc – on a screen without having to write code for them. This makes the process of interface design, interface editing and prototyping significantly easier.

- **Cost**

The cost of development tools ranges from tens to thousands of pounds. The least expensive are generic programming languages, such as C or Pascal, aimed at the experienced programmer. The dearest parts are iconic environments (where icons are used in place of program code) such as Authorware or IconAuthor, aimed at the novice

developer. An important to be considered when comparing costs is the time that it will take the developer to learn to use the package.

- **Runtime Licensing**

Many, though not all, proprietary authoring environments require runtime modules (reduced versions of the environment with the development functions removed) to be distributed with completed applications in order to 'play' them. The owner of the environment may as well charge royalties for the distribution of these modules or impose conditions on distribution and packaging. This can have significant cost implication if the courseware is intended for a large market.

- **Future of the Environment**

A major worry with any proprietary development system is that it will become obsolete either lack of support from the company or because the company goes bust. Of course every company will assert that it is financially sound and will support its products until the sun goes out. So informal intelligence via newspapers, magazines and user groups can aid judgement upon the product as to whether the tool has a future. This consideration militates in favor of tools, which have large installed bases and against newer authoring environments.

- **Technical Support**

Is technical support available, either from the tool supplier or elsewhere (eg. Internet discussion lists, manufacturers WWW server)? Although often sadly neglected, this should be an important factor in tool selection. Significant time and money costs can be incurred if the developer is unable to access expertise on the tool when problems arise. Besides, an inferior product can result if the developer cannot find the best ways to implement features. Consideration of this factor militates in favor of generic programming languages and popular authoring tools against little-known newer systems, and in favor of tools widely used.

4.5Comparing Development Tools

The final part of this section looks at four common authoring tools used – KnowledgePro, Visual Basic, Authorware, and Multimedia Toolbook – examines the merits and demerits of each tool.

It is never possible to be completely objective about a software application, and although a reviewer can try to use objective assessment criteria inevitably personal experience and bias will color the outcome. It's even possible to be plain wrong. Thus, the view expressed in the following sections are not intended to be the authoritative word on the worth or otherwise of an authoring tool and should not be read as such. There is no substitute for trying a tool out for your self.

- **KnowledgePro for Windows (KPWIN)**

KnowledgePro for Windows (KPWins) is a fourth generation programming language (4GL). Produced by Garden Inc., who advertise it as "a tool for developing fast, runtime free Windows applications... whatever your level of expertise." It is available in three forms:

- KPWin – The basic KnowledgePro interpreter
- KPWin Gold – As above, with the royalty-free runtime system
- KPWin ++ - As Gold, with a C++ generator

Although undoubtedly less difficult to learn and use than C or Pascal for Windows KPWin is nevertheless a Windows programming language which attempts to retain a lot of functionality and close control over the Windows environment. The developer is not shielded from the Byzantine complexities of the Windows environment and so KPWin has a steep learning curve in comparison to the other systems, particularly if the author/programmer is new to Windows programming.

The history of KnowledgePro is as an object-oriented, list handling, hypertext, and expert system language, which originally ran in Dos. KnowledgePro for Windows was released in 1990 and was one of the first 'friendly' Windows languages. As a generla-purpose Windows development tool it seems to be positioned between C++ and Visual Basic, and is certainly a product to consider for a language that combines low-level control over the Windows environment with high-level ease of coding. It was built for list and text handling, particularly hypertext, and is hard to match as a niche product in this field. It is certainly a lot easier to use than C or Pascal for Windows yet it still retains considerable functionality and flexibility. It has to be said , also, that it is an excellent introduction to Windows programming and Object-Oriented Programming – not painless, to be sure, but far less painful than C or Pascal.

Pros

- Using KPWin ++ and a C++ compiler, applications can be compiled to executable form.
- Excels at text and list handling, and Hypertext
- No runtime restrictions
- Good introduction to Windows programming

Cons

- All functions require coding, although this is also a pro insofar as there is no 'hidden code'
- Poor screen designer
- Moderately difficult to learn
- Little tutorial material available
- Fairly expensive if you want to produce compiled applications

- **Authorware Professional for Windows (APW)**

Authorware is perhaps Macromedia's best-known product aside from Director and is widely used. It's an iconic tool specially designed for the development of educational software and training applications by non-programmers. Each of the eleven icons available to the workspace has a particular function, like display or decision, and the development process involves dragging icons from the toolbar on to a flowchart which controls the program flows.

APW was designed for the non-programmer, requires no coding from developer, and is very easy to learn and use, particularly from the multimedia viewpoint. APW applications tend to be full-screen and with little Windows look-and-feel.

Macromedia make a strong selling point of APW's dual platform capability – there is Mac and PC versions of Authorware – but portability is not entirely trouble-free. Although commercial distribution of finished APW applications off-site is now royalty-free the developer has to sign a long and daunting agreement containing a number of conditions and regulations.

Pros:

- Easy to used due to its non-programmer environment and it does not required coding
- Its dual platform capability – there is Mac and PC versions of Authorware
- Good Internet product support via Macromedia Home Page and listserv list.

Cons:

- Conditions attached to commercial runtime distribution
- Expensive
- Slow execution compared to compiled applications
- Poor screen design capability

- Little Windows look-and-feel

Visual BASIC by Microsoft

Microsoft Visual Basic was the first truly general-purpose, easy to learn and use, graphical Windows development tool on the market. By enabling anyone to create professional-looking Windows applications it became extremely popular and is still one of the most widely used development tools around.

Visual Basic is a radical departure from previous forms of Basic Insofar as it allows many parts of an application to be created without code, purely by placing controls, such as buttons and dialogues, on a form and changing the properties associated with them. Another difference from 'normal' Basic is that Visual Basic applications can be compiled, although the environment runs in interpretive mode. The Professional edition of Visual Basic comes with a library of custom controls to handle such functions as MCI control and communications, and is the version necessary to create multimedia applications, as the 'basic' Visual Basic has no multimedia functionality.

One of the major advantages of Visual Basic is that you can get started away. It is a boost to confidence when you can create something that works within an hour of installing a package, and it is quite produce a form with considerable functionality purely by using the custom controls and without any coding. The learning curve steppens somewhat when coding is required, although as the code is dispersed amongst forms, controls, and modules it is broken up into digestible chunks which can attached to identifiable functions like a command button, or a dbl_click event. This is less frightening for the non-programmer, who is not faced with a long mind-numbing programming listing.

Visual Basic's main strengths lie in its flexibility, ease of use, and large user base. Whilst "third-party add-ons" can be obtained that will add hypertext and text-handling capabilities.

Visual Basic introduces a variety of features that make it easier for you to create powerful, flexible applications. For example, you can load multiple projects into a single session of the programming environment, work with Windows registry settings, or selectively compile certain parts of your program. Beyond the fundamentals of writing code, Visual Basic provides a variety of language elements that enhance your code. The last four topics in this chapter discuss four of these language elements: user-defined types, enumerated constants, arrays, and collections.

- Working with Multiple Projects

You can create many applications by working with a single project. However, as your applications become more complex, you may want to work with multiple projects in the same session of the programming environment. For example, you may want to use one project to build an application's executable file, and a second project to serve as a "scratch pad" for testing code before you add it to the application. You can add a new or existing project to your current editing session by adding it to a *project group*. You can then save the project group and work with it in subsequent editing sessions. You can open either the project group or an individual project in the project group, or add the project group or its individual projects to another project group.

- Using Condition Compilation

Conditional compilation lets you selectively compile certain parts of the program. You can include specific features of your program in different versions, such as designing an application to run on different platforms, or changing the date and currency display filters for an application distributed in several different languages.

- Working with Resources Files

A resource file allows you to collect all of the version-specific text and bitmaps for an application in one place. This can include icons, screen text, and other material that may change between localized versions or between revisions or specific configurations.

- Working with Templates

Visual Basic provides a variety of templates for creating common application components. Rather than creating all the pieces of your application from scratch, you can customize an existing template. You can also reuse custom components in multiple applications by creating your own templates

- Working with Command Line Switches

Command line switches provide a way to control how Visual Basic executes. Using command line switches, you can start an instance of Visual Basic and run a specified project, make an executable file or dynamic-link library, or specify a string to be passed to the Command$ function.

- Compiling Project to Native Code

If you have the Professional or Enterprise edition of Visual Basic, you can compile your code either in standard Visual Basic p-code format or in native code format. Native code compilation provides several options for optimizing and debugging that aren't available with p-code.

- Creating Own data types

You can combine variables of several different types to create user-defined types (known as *structs* in the C programming language). User-defined types are useful when you want to create a single variable that records several related pieces of information. You create a user-defined type with the Type statement, which must be placed in the Declarations section of a module.

- Using Collections as alternative to arrays

Although collections are most often used for working with objects, you can use a collection to work with any data type. In some circumstances, it may be more efficient to store items in a collection rather than an array. You may want to use a collection if you're working with a small, dynamic set of items.

- The primary advantage of VB over other tools is it's integration with the Windows environment. There are number of built-in and third party control (OCX and ActiveX) that make multimedia integration easy and effective.

- These add-on component include:
  i) Graphical tools for loading multiple file formats and for providing various effects (fade in/out, dissolves).
  ii) Audio tools for playing wave and midi files.
  iii) Digital video tools for playing audio-video interleaved and MPEG files.

- The downside for multimedia application is the fact that VB is designed to be a programming environment and does not easily lend itself to the temporal sequencing or page-oriented features of other multimedia authoring tools such as Macromedia Director.

- There are generally two approaches for combining VB with multimedia
  i) Add multimedia elements such as graphics, audio, and video to more classic application.
  ii) Build multimedia-authoring tools in VB that will be used to create multimedia products.

In conclusion,

Pros:

- Easy to learn and use
- Inexpensive
- Vast amount of tutorial and support material available in books, magazines and online
- Applications compiled to executable form, and there are no restrictions on distributions

Cons:

- No hypertext capability
- Poor at text handling
- Required a lot of coding in a daunting programming language

- **Director Version 7.0 or later by Macromedia**

This is the authoring tool that will be used mainly for this courseware. It supports presentation of audio, graphic, text, animation and video. It uses many icons to represent different characteristics and function. This tool allows the developer to import images, sound, movie and animation from an external source.

It's an iconic tool specifically designed for the development of educational and training application by non-programmers. Director was designed for the non-programmer, requires no coding from the developer and is very easy to learn and use, particularly from the multimedia viewpoint.

Pros

- Its programming language used scripting Lingo in building the multimedia application. This enable the interaction between graphics, audio, video, animation and others multimedia elements because Lingo has its own built-in-function with the instruction similar to English Language.
- User friendly interface which make the combination of multimedia elements more easily.
- This authoring tool also has the facilities to edit sound, images and 3-dimension illustrations that are needed to enhance the multimedia courseware.
- Its screen design such as button and toolbars which similar to the Windows program.
- Its ability to support all kind of audio, video and image graphics files.
- Director is cross-platform software. This means that the application developed using Director will be able to run in Windows and Macintosh environment without any conversion.

Cons

- Slow execution compared to compiled application.
- Large in size of the developed application.
- Fix screen size. Thus, need to adjust the screen size during the development of the application.

Authorware Professional for Windows (APW)

Authorware is perhaps Macromedia's best-known product aside from Director and is widely used. It's an iconic tool specially designed for the development of educational software and training applications by non-programmers. Each of the eleven icons available to the workspace has a particular function, like display or decision, and the

development process involves dragging icons from the toolbar on to a flowchart which controls the program flows.

APW was designed for the non-programmer, requires no coding from developer, and is very easy to learn and use, particularly from the multimedia viewpoint. APW applications tend to be full-screen and with little Windows look-and-feel.

Macromedia make a strong selling point of APW's dual platform capability – there is Mac and PC versions of Authorware – but portability is not entirely trouble-free. Although commercial distribution of finished APW applications off-site is now royalty-free the developer has to sign a long and daunting agreement containing a number of conditions and regulations.

In conclusion,

Pros

- Easy to used due to its non-programmer environment and it does not required coding
- Its dual platform capability – there is Mac and PC versions of Authorware
- Good Internet product support via Macromedia Home Page and listserv list.

Cons:

- Conditions attached to commercial runtime distribution
- Expensive
- Slow execution compared to compiled applications
- Poor screen design capability
- Little Windows look-and-feel

Toolbook

A popular development tool, Asymetrix Toolbook uses a book and page metaphor, akin to Hypercard's stack and card idea. Indeed, it has such a Hypercard look and feel that it used to be referred to as 'Hypercard for the PC'. Toolbook has its own programming language, OpenScript, which is very similar to Hypertalk. (Curiously, despite its obvious similarity to Hypercard, there is no Mac version of Toolbok and no inter-platform portability.). It's a more general-purpose development tool than Visual Basic, Icon-Author, and Authorware, as it can be used to produce not just courseware but also "heavy-duty" applications such as databases. It is particularly suited to text handling and is ideal for applications with large amounts of text.

Like Visual Basic, the developer 'draws' objects – such as buttons and fields – on a "page" or "background", the behavior of which is controlled by code ('scripts') either attached to the object or placed further up the "object hierarchy". This approach is very flexible and allows the developer a lot of scope, but also makes the package more difficult to learn and to use than, let's say Authorware, because the developer has to learn not only how to code but also where to place the code.

How easy or difficult the user finds Toolbook will very much depend on their previous experience. Hypercard developers will be immediately familiar with the environment and will be able to produce meaningful work very quickly. Windows-based programmers will require a little adjustment to the peculiarities of OpenScript, but before long they will also be producing good work. Completely novice developers, or developers used to iconic developments tools, will face a learning curve which is not made any shallower by the lack of tutorial materials available for the packages. However, Asymetrix have attempted to ameliorate this situation by producing the Toolbook CBT Edition which, according to Asymetrix, "includes all of the power and

features of Multimedia ToolBook 3.0, plus an expanded feature set tailored to the specific needs of courseware authors", and is reputedly easier to learn and use.

In conclusion,

Pros:

- Easy to use and learn for Hypercard developers
- Excellent Internet product support, both via Asymetrix Homepage and listserv list
- No distribution restrictions
- Inexpensive compared to iconic tools (although dearer than VB or Delphi)
- Easy screen design

Cons:

- Moderate learning curve for novice developers – lots of coding required
- Little tutorial material available
- Slow execution compared to compiled applications

Microsoft Access

Microsoft Access is such a rich and powerful application that most people does not know where to begin when they start using it. Access makes it easy for users – even beginners – to work with databases. You can create tables, edit data, and use queries to find the data you want with very little effort, and Access includes wizards which can do the work of designing data entry forms, reports, and mailing labels for users. Access also makes it easy for developers to create applications. It includes on entire programming language, Visual Basic for Applications and its interface is so powerful that developers can create many custom applications with programming.

Below states the features of Microsoft Access that can be used by developers using Visual Basic

- Microsoft Access is a stand-alone relational database product. Access includes two features that can be used by Visual Basic programmers – Data Access Objects (DAO) and Microsoft Jet. The Jet Database engine is the data manager on which Microsoft Access is built. JET can be manipulated by DAO using VB code or with the intrinsic data control using no code
- The Visual Basic 6.0 intrinsic data control takes advantage of DAO to provide even simpler data access using bound controls. As we have already seen, the DBList, DBGrid and DBCombo controls, when bound to an intrinsic data control, can provide nearly all of the DAO functionality without even having to write any code
- VisData (which happens to be written in Visual Basic) is a program that provides a graphical font end to create and manipulate Access database. So VisData is a limited font read to Access tables. VisData communicates with the database by using DAO and Jet

4.6 Conclusion

For Windows developers, it is not possible to pick out a development tool as a 'must-have' package. Each tool has its strengths and weaknesses and a particular target market of users and the choice of tool will in all likelihood be dictated more by local factors such as finance and available expertise than by technical quality alone. However, careful tool selection is important, not just for the planned application but also for the future. Once money and time has been invested in buying and learning a tool there is a strong disincentive to use other tools for future application development even if they may be technically more suitable.

Based on the choosing criteria that listed above, Visual Basic 6.0 is the most suitable tool to be used in developing this English learning package. This is because as a developer, I have experience in using compares with other languages, and it possess the basic features to implement the application such as images, sounds and animations. Further more, Visual Basic has a strong screen design capability that enables the process of interface design, interface editing, and prototyping significantly easier. At the same time, no extra cost to be paid for the licensing because it is already available in computer lab in this faculty. Finally, it is easier to access expertise on the tool when problems arise, either from large variety of books in the market or discussion groups in the net. And for editing the images and animations, Director 7.0 by Macromedia will be used. Finally, the data needed to present the idioms and used for quizzes will be stored using Microsoft Access.

4.7 Requirement Analysis

Each proposed model of the software process includes activities aimed at capturing requirements: understanding what the users expect the system to do. Thus, our understanding of system intent and function starts with an examination of requirements.

When we build a system, the user has some notion of what the system will do. Often, the new system replaces an existing system or way of doing things. Sometimes, the new system is an enhancement or extension of a current system. More and more frequently the proposed system is planned for doing things that have never been done before. No matter whether its functionality is old or new, each software-based system has a purpose, usually expressed in what the system can do. A requirement is a feature of the system or description of something the system is capable of doing in order to fulfill the system's purpose.

Requirement Elicitation

Requirement elicitation is an especially critical part of the process. Requirements are elicited at the beginning of the development, and our goal is to determine the nature of the user's problem. One way of collecting user's requirements is through questionnaire, and I have prepared one for the targeted users or/and customers, as shown below

Questionnaire

Hello! Would you like to answer some questions on CAL for English Idioms?
Your answers will help to make better CAL (Computer Assisted Learning) software and hence help the English learner in the future!
Please answer the following questions as accurately as possible. Thank you in advances.☺

1. Have you ever bought or used a computer assisted learning application (for your children)?
   (In case you are not sure: Computer Assisted Learning software is any software that is used in teaching and learning)
   ☐ Yes — If yes, please continue
   ☐ No — If not, please goes directly to question number 8

2. What was taught in the package?
   ☐ Language ☐ Science ☐ Mathematics ☐ Mix ☐ Others

3. What do you think of the software in general?
   ☐ Excellent ☐ Good ☐ Average ☐ Poor

4. What were its advantages (if any) according to your opinion?
   ☐ Easy to learn ☐ Effective ☐ Attracting ☐ Others

5. What were its disadvantages according to your opinion?
   ☐ Difficult ☐ Ineffective ☐ Boring ☐ Others

6. Is there something that you believe it lacked?
   ☐ Animation ☐ Video ☐sound effect ☐ Song
   ☐ Game ☐ Exercise ☐ others: _____

7. Is there something you believe should not have been in it?
   ☐ Animation ☐ Video ☐sound effect ☐ Song
   ☐ Game ☐ Exercise ☐ others: _____

8. Which skills do you want to emphasize on learning language?
   ☐ Listen ☐ Read ☐ Speak ☐ Write

9. Which are the learning styles that you or your children used to it?
- ☐ Learn from verbal instruction
- ☐ Needs phonic
- ☐ Enjoys play
- ☐ Distracted by noise
- ☐ Remember by listening, especially with music
- ☐ Games and pictures are annoying and distracting
- ☐ Remembers faces but not names
- ☐ Think in pictures
- ☐ Uses color
- ☐ Learn by doing
- ☐ Not avid reader
- ☐ Poor spellers
- ☐ Doesn't "hear" things as well
- ☐ Loves games

Thank you very much for cooperation! ☺

Figure 4.2: Questionnaire

The above questionnaire has been prepared for one hundred copies, and the results gained are as shown in the table below:

Table 4.2: Questionnaire's Results (Emphasis on language skills)

Skill	**Percentage**
Listening	45%
Reading	50%
Speaking	70%
Writing	40%

Table 4.3: Questionnaire's Results (Emphasis on learning style)

Style	**Percentage**
Learn from verbal instruction	30%
Need phonics	5%
Enjoy plays	25%
Distracted by noise	10%
Remember by listening	35%
Games and pictures are annoying	20%
Remember faces but not name	10%
Think in pictures	20%
Uses color	25%
Learn by doing	40%
Not avid reader	1%
Poor spellers	3%
Does not listen to anything	2%
Loves games	35%

In addition, 40% of the returned questionnaires showed that they had bought CAL packages before and 32% of the packages bought were language learning. Most of them agreed that the packages were good with easy learning, and suggested that the instructions given should be as simple as possible, as well as more animation and exercises are given.

After having analyzed the collected results, CAL for English Idioms that is to be built should emphasize on more animation and exercises, and at the same time integrated the elements of game and sound into the application, of which enables users to learn by doing.

4.8 Hardware and Software Requirements

Every application should have minimum hardware and software requirements to enable the successful running of the program. Following are the listed requirements:

Hardware Requirements

i. System using an at least Intel Pentium 200 MHz or compatible processor
ii. At least 32 MB of memory
iii. Sound card and VGA display card
iv. Speaker
v. Monitor, mouse and keyboard

Software Requirement

i. Microsoft Windows 95 or higher version as operating system

4.9 REFERENCE:

1. Pressman, R.S., *Software Engineering: a Practitioner's Approach*, New York, McGraw Hill, 1992.
2. Keller, Arnold, *When Machines Teach – Designing Computer Courseware*, Harper & Row, Publisher Inc., 1987
3. Hillman, David, *Multimedia Technology and Applications, Chapter 9 – Authoring Tools*, Delmar Publishers, 1997
4. Fred Riley, *CAL Production – The Role of Authoring Systems*, Scaborough, CTI Centre for Modern Languages, University of Hull. 1996
5. MSDN Library Visual Studio 6.0

CHAPTER 5: SYSTEM DESIGN

Design stage in the system development is to translate all the requirements into a solution: a design that satisfies the customer's needs.

5.1 Modules of CAL for English Idioms

There are three main modules for users to explore. In order to assist the user, two additional modules, the Help Module and the Exit Module, were added.

The Modules are:

1. Learning

This module serves the purpose of presenting the information about the English idioms and the meanings that they carry. It will also teach the user how the English idioms presented will be used in daily speaking. The lesson will be divided into smaller parts where users will be given the freedom to stop after each part of the lesson.

2. Interactive

This module contains comics, games and puzzles that will be given to the user to enhance and strengthen their memory about the idioms taught in each part of the lesson.

3. Quiz and Test

This module serves the purpose to test the user's knowledge by answering multiple choice (objective) questions provided in each lesson. This module will examine whether the user really know about what they have learned.

4. Exit Module

This module enables user to terminate and quit from the courseware. A message box will be prompted to get the user's response to confirm the termination made.

5. Help Module

This module serves the purpose of providing guidance about the various navigational buttons and it's respective function.

6. About Module

This module will provide information to user on the CAL for English Idioms version and other project information.

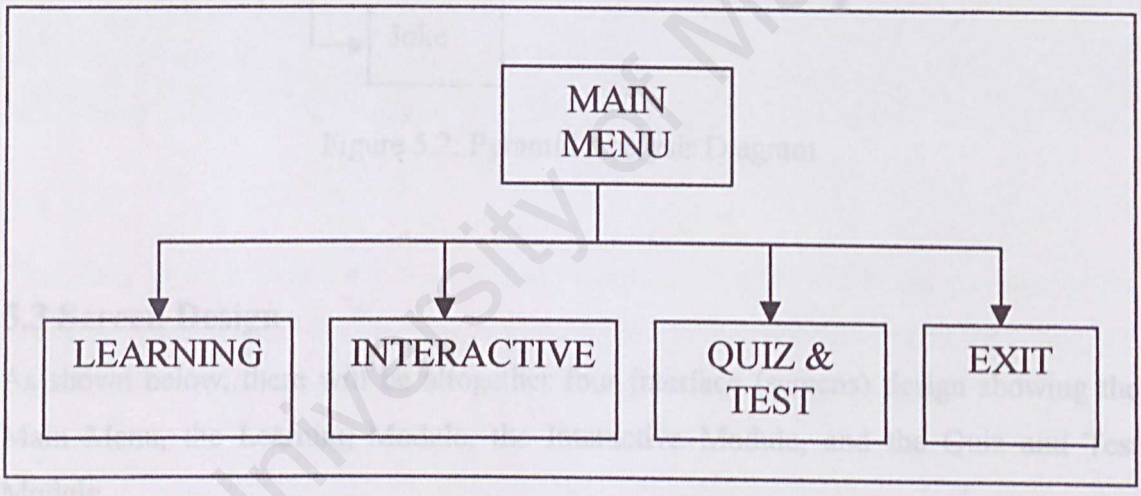


Figure 5.1 System Modules of CAL for English Idioms

5.2 Pyramid Analysis Diagram

The Pyramid Analysis is a technique used to split up the course content of into manageable chunks. These chunks are then combined into modules. Then the order in which to develop them and the chosen media can be decided.

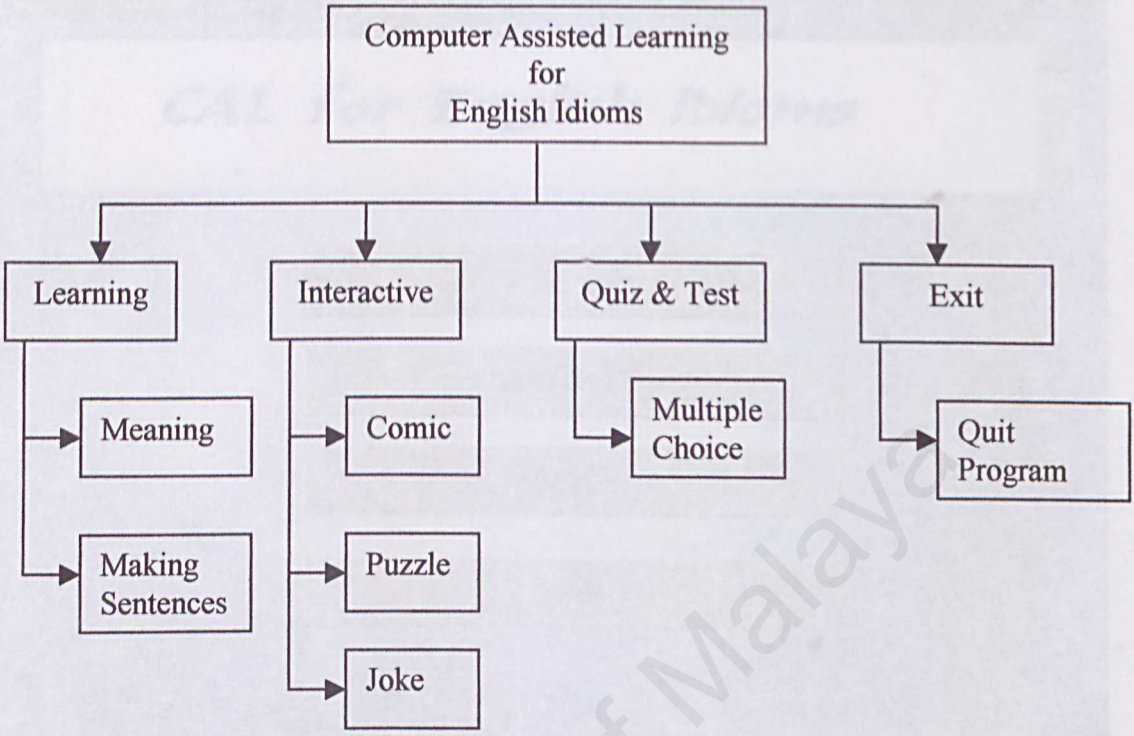


Figure 5.2: Pyramid Analysis Diagram

5.3 Screen Design

As shown below, there will be altogether four interface (screens) design showing the Main Menu, the Learning Module, the Interactive Module, and the Quiz and Test Module.

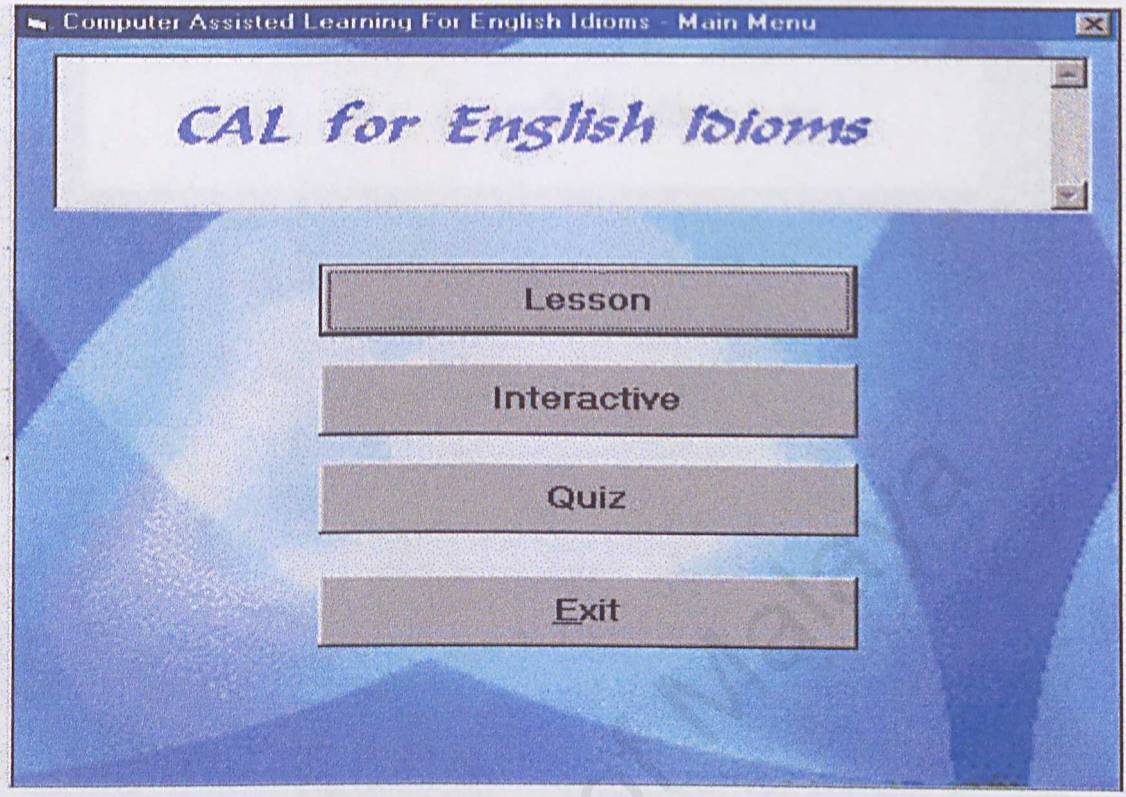


Figure 5.3: Interface Design For Main Menu

The Main Menu contains 4 modules. The 'Learning' button will bring the user to the Learning Module, whereas the 'Interactive' to the Interactive Module and the 'Quiz and Test' to the Quiz and Test Module. The 'Exit' button will quit the program.

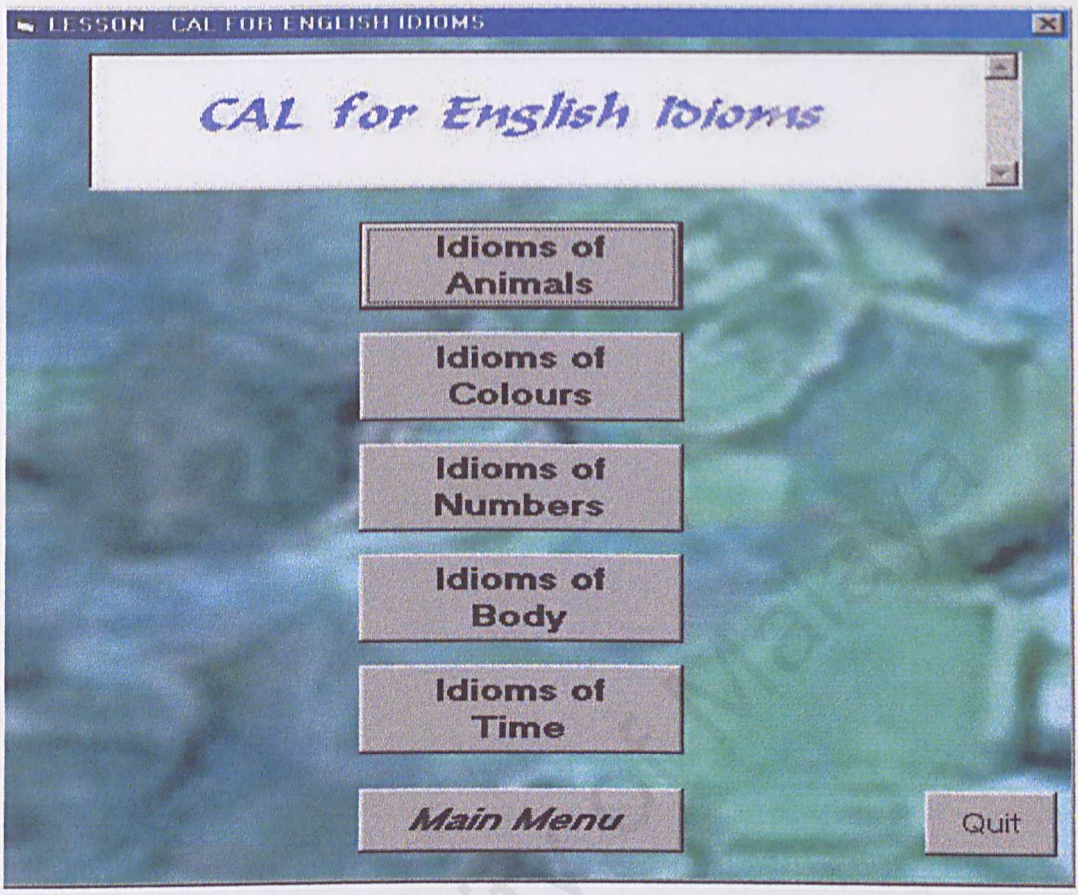


Figure 5.4: Interface Design for Menu of Learning Module

The Learning Contains of ten lessons, each teaching different types of idioms varying from animal idioms, money idioms, color idioms, bird idioms and etc.

The 'Main Menu' button will bring the user back to the Main Menu of the system. 'Quit' button exits the program.

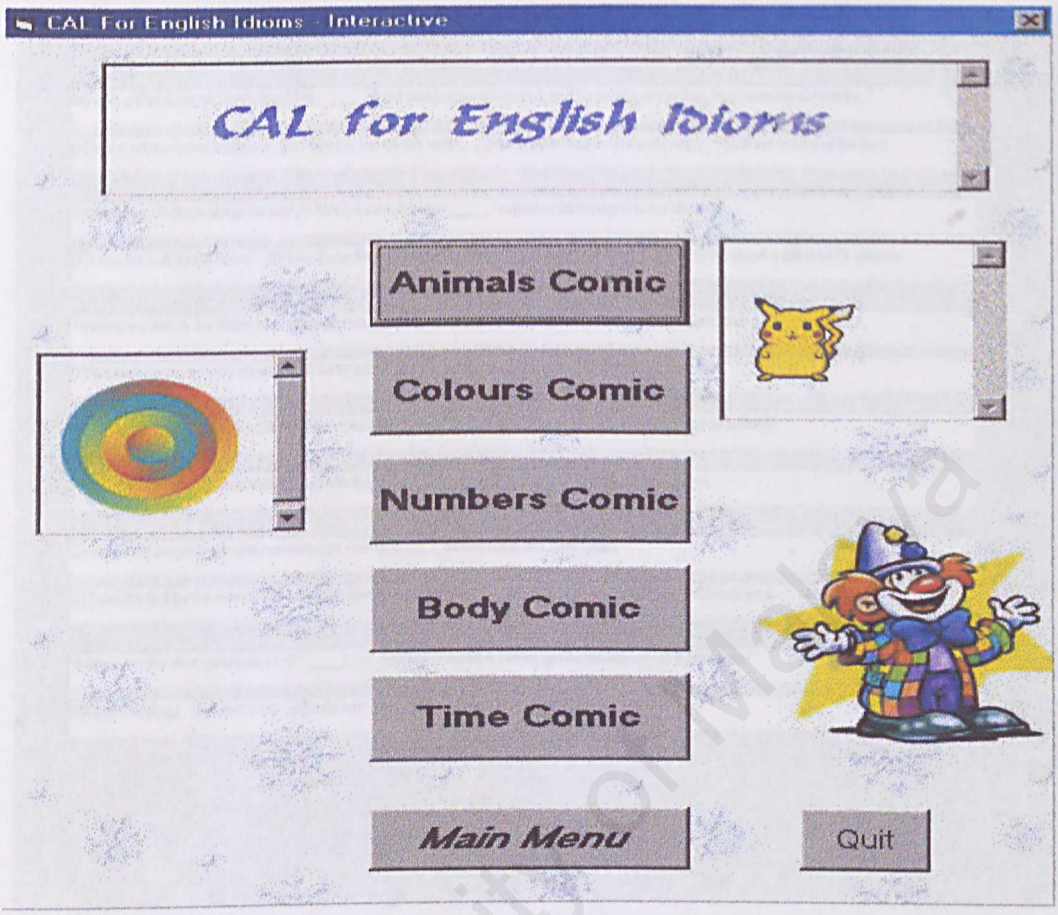


Figure 5.5: Interface Design the Menu of Interactive Module

The Interactive Module contains 5 groups of Idioms related comics to be chosen. The Comic session will let the user learn about the proper time to use English idioms. Clicking the Main Menu button will bring the user back to the main menu. 'Quit' button exits the application.

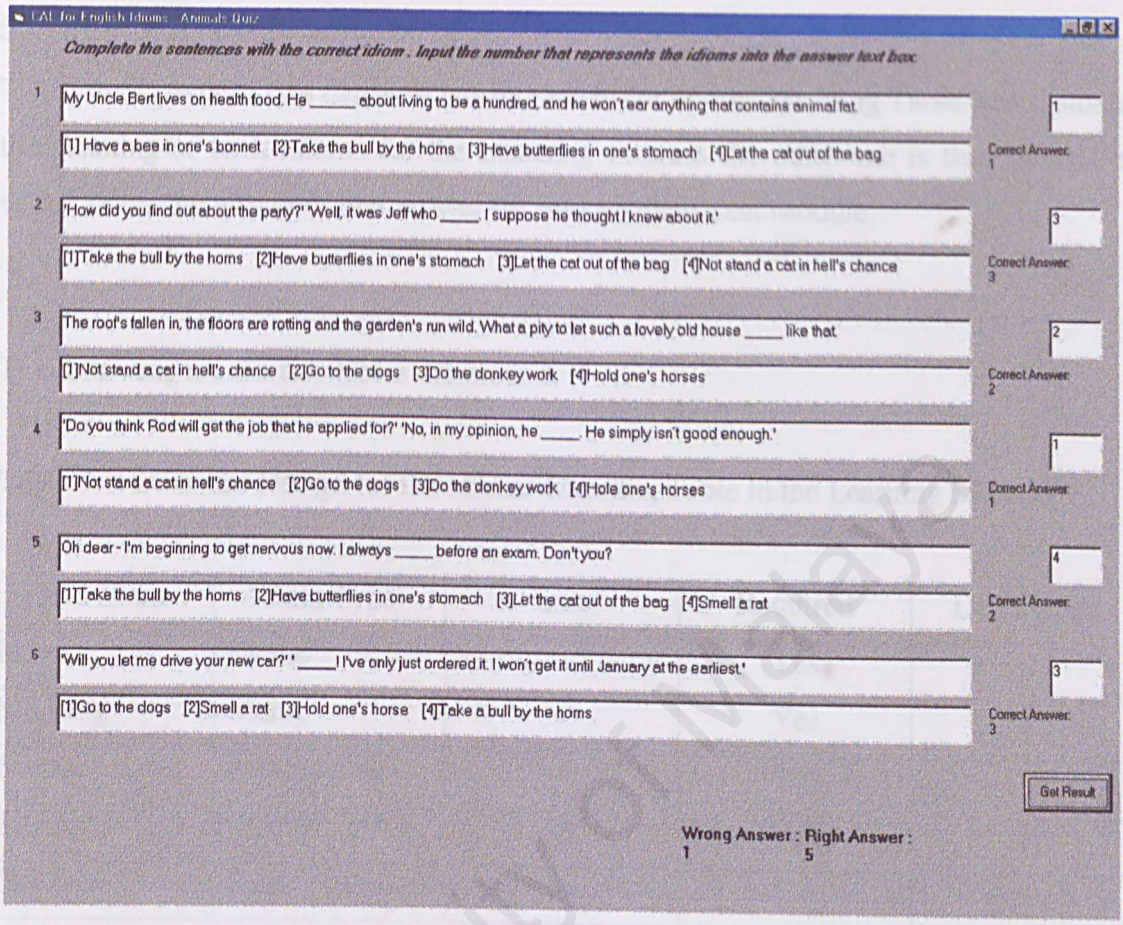


Figure 5.6: Interface Design for the Quiz and Test Module

The above figure shows an example of one of the tests that will be given in the Quiz and Test Module. The user will be given a question of multiple choice during the test. He /She will determine the correct answer in the text box. When he clicks the 'Get Result' button, the system will display the correct answer for each question, and also the number of answer the user has answered correctly.

5.4 Database Design

The system contains two database tables. One is the Idioms-Meaning Table which stores the meaning of each idioms for the Learning whereas the other one is the Quiz table which stores the questions and answer for the Quiz and Test Module.

The following are the two tables mentioned:

Table 5.1: Database Design for the Idioms-Meaning Table in the Learning Module

Field Name	Data Type	Size	Required	Description
Idiom	Memo	-	Yes	-
Meaning	Memo	-	Yes	-
Number	Autonumber	-	Yes	-
Example	Memo	-	Yes	-
Lesson	Text	-	Yes	-

This table contains three fields, the idiom, the meaning and lesson. The Idiom is the field that stores the collection of English idioms while the Meaning field contains the meaning of the appropriate idioms. The Lesson field serves as an ID to the idioms to assign them to the lesson where they will be presented. The Number field provide the index to keep track of how many of data has been inserted and the Example field contains the example of the particular idioms used in a conversation or sentence.

Since idioms are made up of alphabets, it is stored as Memo data type. The same goes to the Meaning field. The Lesson field holds the title of the lesson. So the data type stored in this field is text. Auntonumber data types in the Number field will automatically generated an ascending number when the data was inserted. Similar to the Idiom and

Meaning fields, the data in the Example field also being kept as memo data type. All of the three field are required in the table during data retrieving.

Table 5.2: Database Design for the Quiz Table for the Quiz and Test Module

Field Name	Data Type	Size	Required	Description
Question	Memo	-	Yes	-
Answer	Text	5	Yes	-
Lesson	Text	-	Yes	-
Number	Autonumber	-	Yes	-
Selection	Memo	-	Yes	-

There are five fields in this table - Question, Answer Lesson, Number and Selection. The field Question contains the questions that will be asked in the Quiz. Since questions are formed from a long string of character, it is defined as a memo data type, which can store a very long string. The field Answer will hold the answers for the appropriate questions. It stores text, and required a very small data size. Lesson is the field which serves as an ID for the questions. The text stored in the field Quiz will determine in which quiz the questions will be located. Number field stores the autonumber data type to index the data in the database, while Selection field which stores the selection of the answer of the questions is a memo data type.

5.5 REFERENCE:

1. Geoffrey, R., Heimy, F. and James, P. *Using Computers in Teaching Foreign Languages*, Englewood Cliffs, Prentice Hall, Inc. 1995.
2. MSDN Library Visual Studio 6.0
3. Mauer, Lowell, *SAMS Teach Yourself Visual Basic 6 in 21 Days*, , Indiana, Macmillan Computer Publishing, 1998.

Chapter 6 System Implementation

Introduction

The system implementation phase involves the process of converting the system requirements and designs into program codes. This phase at times also involves some modifications and evolution of the previous design developed in the prototype of the system. Computer Assisted Learning (CAL) for English Idioms is developed modularly using the top-down approach which involves building the high-level software modules that are, after that, refined further into detailed functions and procedures. Before proceeding into coding, a sufficient amount of data for example image files, sound files and the collection of idioms to be present has to be prepared first. Instead of that, it is most important for the developer to identify the development environment that will be used to develop the system.

6.1 Development Environment

Developing environment has certain impact on the development of a system. With the use of suitable hardware and software, the developer will be able to speed up the phase of the system development. The hardware and software tools, which are used to develop and document the entire system, are stated as below:

Hardware Tools

- 200 MHz Pentium Processor
- 512K Pipeline Burst Cache
- 32MB RAM
- 16X CD-ROM Drive
- 2.1 GB Hard Disk
- Speaker
- Scanner and

- Other standard desktop PC components

Software Tools

- Microsoft Windows 98
- Macromedia Director 7.0
- Microsoft Visual Basic 6.0
- Microsoft Word 97
- Macromedia Flash 4.0
- Paint Shop Pro 6.0
- Adobe Photoshop 5.0
- Cdex 1.2

6.2. Development of the System

To build a successful multimedia application, preparation of data collection such as the collection of idioms, the image files and sound files plays an important role. A system will only started to be developed after the required collection of idioms, image and sound files have been created, then only can we continue to the coding part. So, the stage of preparing this data is the stage, which is most time-consuming.

6.2.1. Preparation of Data Collection

This part will discuss the preparation stage of the data collection and how has the data been edited.

For the collection of English idioms, a small part of the collection was downloaded from the internet while the major part of the collection comes from an idioms dictionary entitled, "Oxford Pocket English Idioms", by Jennifer Seidl and W. McMordie. After the collection of idioms has been completed, the idioms are distributed into five groups,

consisting of animal idioms, colours idioms, idioms with key words about numbers, size and measurement, idioms with key words about parts of body and time idioms. Such distribution not only enables the user to differentiate the idioms according to their group but also make the learning process of the system to be more enjoyable.

Images and graphics are used in the interactive part of the system while sound files are used as background music and themes during the execution of the system. For the Image files, the picture come mainly from a set of comics entitled "Mafalda" drawn by a Spanish artist named Quino. Since the colours of the images are not clear enough, Paint Shop Pro 6.0 and Adobe Photoshop 5.0 are used to edit the images. Adobe Photoshop 5.0 is used to edit and repaint the images so that the color and beauty of the images can be enhanced. Paint Shop Pro 6.0 is used to convert the images from .bmp file format to the .jpeg file format in order to reduce the size of the particular file.

In addition of that, Macromedia Director 7.0 and Macromedia Flash are used to create the animations to make the presentation of the English idioms become livelier. Besides, some interesting images are downloaded directly from the internet in .gif format without further modification. This includes files such as cartoon images, in order to attract the attention of the children.

Sound files, saved in .wav format, are used as the background music and theme of the system. This process is done through converting the audio from music CD into the wav file using the Cdex 1.2 software. Besides of that, some other interesting sounds are downloaded from Internet in .wav, ..mov and .avi format to make the application more enjoyable.

6.2.2 Coding

Microsoft Visual Basic is the scripting language used to code and develop the system. It was the first truly general-purpose, easy to learn and use, graphical Windows

development tool on the market. By enabling anyone to create professional-looking Windows applications it became extremely popular and is still one of the most widely used development tools around.

Visual Basic comes with a library of custom controls to handle such functions as MCI control and communications, and is the version necessary to create multimedia applications, as the 'basic' Visual Basic has no multimedia functionality.

One of the major advantages of Visual Basic is that you can get started away. It is a boost to confidence when you can create something that works within an hour of installing a package, and it is quite produce a form with considerable functionality purely by using the custom controls and without any coding.

Visual Basic's main strengths lie in its flexibility, ease of use, and large user base. Whilst "third-party add-ons" can be obtained that will add hypertext and text-handling capabilities.

Visual Basic makes it easier for you to create powerful, flexible applications. For example, you can load multiple projects into a single session of the programming environment, work with Windows registry settings, or selectively compile certain parts of your program. Beyond the fundamentals of writing code, Visual Basic provides a variety of language elements that enhance your code.

6.2.3 Setup Module Functionality

The Lesson module plays the role to presents the idioms in the groups they belong to. One idioms consisting its meaning and example to use it was shown in each frame. The number of the idioms presented will be shown. This enables the user to stop where they want and resume the lesson by going to the last idioms taught in the previous lesson. The number of idioms in this module differs from the range of 30 to 70.

The Interactive module displays story and comics which will shows how the idioms were used in a humorous way. The number of story or comics displayed in this module range from 5 to 10.

The Quiz module plays an important role in accessing users achievement prior or after going through the Lesson module. Several references were gone through in order to preserve the appropriateness and the consistency of the questions.

For the development of this module, a prototype was developed first. Initial setting was for two questions. Only after the script written shown positive results that the number of questions expands to six. Since users' attentions endurance was considered, each set of quiz only consists of six questions. Sound effects were added to draw user's attention. Logic flows like looping and if-then-else were used in controlling this module's behavior.

The two actions that must be considered are:

1. what to do if the answer match
2. what to do if the answer does not match

This module will also show the numbers of questions answered correctly for the quiz. Answers for each question will be revealed after all the users have answered all questions.

REFERENCE:

1. Geoffrey, R., Heimy, F. and James, P. *Using Computers in Teaching Foreign Languages*, Englewood Cliffs, Prentice Hall, Inc. 1995.
2. MSDN Library Visual Studio 6.0
3. Mauer, Lowell, *SAMS Teach Yourself Visual Basic 6 in 21 Days*, , Indiana, Macmillan Computer Publishing, 1998.

Chapter 7 Testing

7.1. What is testing?

Testing means examining the project performance according to the specification that have been agreed. This includes the robustness of the code, the structure and the content of the program, the interface, the interactivity, the look and feel. Due to hardware and software installation problems on the playback system, the best option is to abide by the golden rule of multimedia development, " Test early, test often, test on all target platforms." The strategies used for testing are unit testing, module testing, sub-system testing, system testing and acceptance testing.

7.1.1 Unit Testing

Unit testing focuses on the smallest software unit whereby individual components are tested to ensure that they operate correctly. Each component is tested independently, without other system components. Bottom-up testing method was used to validate and verify the working functionality of the lower-level units before proceeding to the higher-level units.

Microsoft Visual Basic 6.0 provides several debugging tools to help find errors in logic flow line, variable and syntax. Visual Basic 6.0 has its own error messages and numbers. These values can be tested and used with the error-handling procedures.

7.1.2. Module Testing

A module is a collection of dependent components such as an object class, an abstract data type or some looser collection of procedures and functions. A module encapsulates related components so can be tested without other system modules. Testing was done to ensure the correct flow of movie, events and navigation.

7.1.3. System Testing

The various sub-systems in this courseware are integrated to make up the entire system. The testing process is concerned with finding errors, which result from unanticipated interactions between sub-system and system components. It is also concerned with validating the system meets its functional and non-functional requirements.

7.1.5. Acceptance Testing

This is the final stage in the testing process before the system is acceptance for operational use. For this courseware, alpha and beta testing had been carried out. The alpha testing was done by other coursemates who also deal in multimedia projects and friends. The alpha testing was carried out prior to the beta testing. The testing was performed for 1 week.

The beta testing involves the target users and parents. This also took a week to be concluded. Feedback from the users varies and has been very useful for me to do the modification.

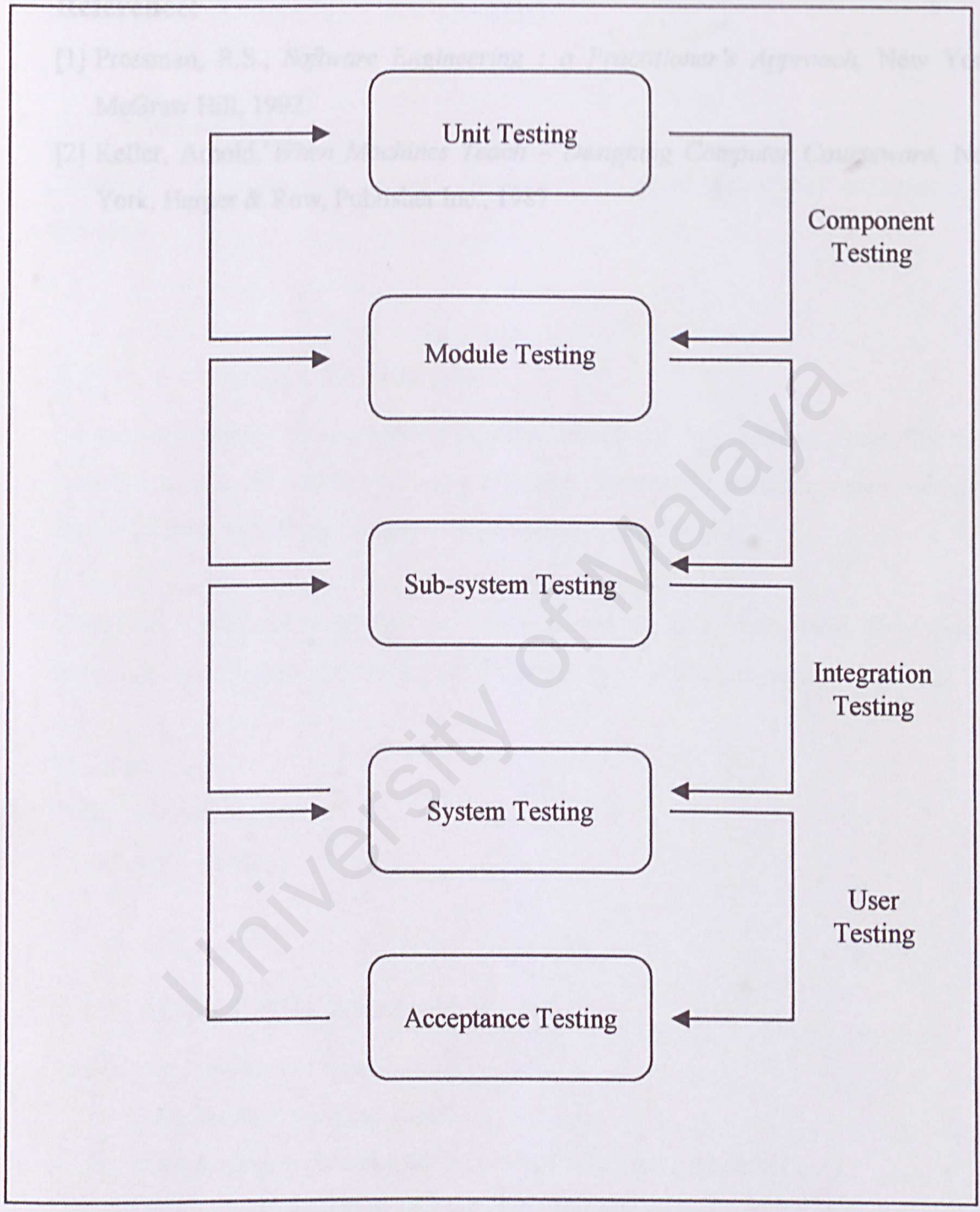


Figure 7.1 shows stages of testing throughout the system development phase.

Reference:

[1] Pressman, R.S., *Software Engineering : a Practitioner's Approach*, New York, McGraw Hill, 1992.

[2] Keller, Arnold, *When Machines Teach – Designing Computer Courseware*, New York, Harper & Row, Publisher Inc., 1987

Chapter 8 System Evaluation

8.1. Evaluation

Evaluation is an on-going process throughout the development and implementation phases.

8.1.1 . Formative Evaluation

Formative evaluation is an on-going process through the development phase. The main reason is to take the courseware more effective. Summative evaluation was conducted for the purpose of making changes concerning the entire program.

Two types of formative evaluation were adopted for this courseware development. Responses and feedback received from the target users is encouraging.

There are:

a) one-to-one , and
b) small group

8.1.2. Multimedia Evaluation

Audio, music, video and special effects

1. Is the audio smooth and clear?
2. Does the audio/ special effects coincide with visual material?
3. Do the special effects contribute to the application message?
4. Is the background music appropriate; does it add any value?

Graphics and touch area (hot-spot)

1. Has sufficient space been allocated for the touch areas?
2. Have colors been planned to support visual acknowledgements?
3. Is the shape of the visual target matched to the touch area?
4. Does the accompanying audio support the graphics?
5. Does the highlighting support the message?
6. Are they consistent? In the aspects of Colors, fonts, art types, purposes?
7. Does the user easily process them?

8.1.3 Performance Evaluation

In order to optimize the performance, the size of the courseware would be kept small relatively. With basic hardware requirement, this courseware can perform smoothly on any PCs. This can be achieved by reducing the archive through save and compacting and the integration of small media files.

Concept Testing

This approach comes from marketing. It means trying out the main project ideas on selected groups of people representative of the intended user group. This is conducted very early on so it would be prior to any prototype stage of development. The aim of concept is to check out if the predicted reactions to the proposed product (project) match the wishes of the users. This is done early in development so that the design can be adjusted in line with the finding and so that there is more confidence that the intended direction will be successful.

Prototyping

Prototyping in multimedia application is derived from software development and is a mock-up of several of the key features from the program. It is designed to get feedback on the general look and operation of the design as early as possible during expected outcome from reading the specification documents and the reality of the way programs actually worked. Prototypes can also be used with users to gather their reaction to the main operation at a stage where changes in the design can be made efficiently.

Peer Review

A faster approach to testing the concepts is to get friends to bring their experience to bear on them. This is important because mix skills are needed in the multimedia design. The aim of this peer review is to refine the design at an early stage in order to help to make the development faster.

Usability Evaluation

These usability tests applied when the project has been integrated and is ready for release. These evaluations originated in software development as a method of proving that the program met the needs of the users.

Field Trials

The application will be tested on the spot with the users. They will be observed and interviewed. The users will be required to fill in questionnaires. The data is collected, analyzed and the recommendations for redesign will be given.

8.2 Project Problems and Solutions

There are several problems faced during the development of the system. The following will state them out together with the solution found for the mentioned problem.

8.2.1. Problems and Solution during Project Studies and Analysis

One of the major problems encountered during the project system studies and analysis is the difficulty in choosing a development technology, programming language and tools. There are many ways and tools available to develop a multimedia application as stated in the earlier chapters. Choosing a suitable technology and tool proves to be a critical process as all tools has its strength and weakness. Besides, availability of the requirement tool for development is also a major consideration. For instance, a tough decision was needed to decide between using Macromedia Director 7.0 or Microsoft Visual Basic 6.0. To determine which approach to use, seeking advises and views from project supervisor and coursemates engaging in similar project are carried out. Further more, surfing through the Internet and visiting the library helped in the aim to clarify some existing doubts.

Another problem faced during these phases is the difficulty in determining the scope of system to be built. As the name *Computer Assisted Learning for English Idioms* is implied, to built a full- scale complete system according to the large collection of English idioms is impossible because this will not only exhausted the developer of the program but also the user who try to learn English Idioms. In addition, a collection of idioms too large for the database will increase the storage space of Hard Disk required in a PC. This means that the system had gone opposite of what it had wanted to be –only

need small storage space for the smooth-running of the program and can be used by most targeted users. Discussions were held with project supervisor to outline the scope of project to be built during the initial stages of the project. As a result of the discussions, the scope has been set to divide the collection of idioms into small groups for example, idioms on colors, idioms on animals, and etc. This not only enables the users to learn more easily but also makes the lesson to be presented more systematically. Since, the targeted users of this multimedia courseware are children and people who have just begin to learn English, five types of idioms are selected for the presentation in the Lesson Module. They are Animals, Colors, Numbers, Body and Time.

8.2.2. Problem and Solution during Project Implementation and Testing

The main problem faced during implementation and testing phases is the inexperience in using the image as well as audio processing tools such as Photoshop 5.0 and Macromedia Flash. A lot of time was spent to explore the features and functions of the tools when editing the images scanned.

Another problem encountered during these phases is the failure of looking for the video file from the Internet. A lot of time was spent to browse the net but not much of the search results are useful. As a result of that, not every idiom have a presentation for the particular topic.

Problem also arises when distributing the system because the size of the program was quite big. To reduce this problem, some of the image files are compressed to minimum the size but maintain the balance between the quality and the size of the image.

However, some image files have to leave in bitmap format because compression will affect the quality of the image.

User testing is limited due to the limited time frame and the size of the system. Therefore, the completed system is tested only by friends and relative's children (beginner in English learning) in order to gain advises and suggestions.

8.3. Evaluation by End Users

Due to the limited time, only 3 primary students and 7 end users in 20s were invited to test and evaluate the system. Questionnaires were prepared to get feedback from the users to validate project objectives. During the process of testing, they had expressed their views and comments regarding the aspects of interface design, architecture structure, media display, navigation, interaction and the level of ease of use. End users need to fill in the questionnaires after they had tried the system thoroughly.

Besides the questionnaire, observation has also been made towards the reaction when the users are trying the system. The toleration of delay time, menu and articles understanding and the attraction or willingness of users to explore had also been known through observing the reaction from the body language.

The questionnaires in concern were attached to the Appendix section.

The statistics for each question from the relevant questionnaires is given below in percentage:

8.3.1 Questionnaire Result Analysis (%)

Target users: Multiple groups

Composition: Primary students 30%

Others 70%

1. Do you like to browse computer CD-ROM to gain knowledge?
   Yes (80) No (20)

2. Will you want to gain knowledge about mammals through this multimedia package?
   Yes (80) No (20)

3. How easy to browse this CD-ROM?
   1 (20) 2 (60) 3 (10) 4 (10) 5 (0)

4. Are you able to gain mammals' knowledge through this multimedia package?
   Yes (90) No (10)

5. Are you attracted by the presentation?
   Yes (70) No (30)

6. Are you able to control the flow of the content?
   Yes (90) No (10)

7. Your assessment on this multimedia package:
   Not satisfied (10) Satisfied (70) Very Satisfied (20)

8.4. System Strengths

✓ Colorful and Attractive Graphical User Interface (GUI)

This courseware applies a user-friendly concept by portraying the various true color images and enhanced graphics. Besides that, soft color with proper contrast increase the mental alertness and the level of understanding a particular topic.

Visual presentation and permanent location grid icons and buttons allow users to feel comfortable while navigate within the modules. Thus, relieving frustration and confusion of users while using this courseware.

✓ Instruction

Handy compact and helpful instruction are provided throughout the courseware to make sure users are prompted with related information upon starting a specific activity. Meaningful labels and visualized icons were chosen to further enhance the control of the courseware flow.

✓ Interactive

The Quiz and Interactive Modules in the courseware provides the users the means to test their capability and knowledge in using idioms in daily conversation.

.

✓ Flexibility

This courseware provides a high degree of flexibility for target users (primary students from various types of stream). The structure of the information content was shaped to make sure that they are able to access the system at their own convenience. Students can choose what they want to do in whichever order that they like. This can reduce the time required to bring the student to a satisfactory level of

understanding. Since instruction time is costly in both manpower and money, this can also pay-off economically.

✓ Multimedia Elements

This courseware managed to integrate various types of media elements. Users, while going through the text content can visualize the information by the pictures enclosed at the same page. Animation, sound and video display enhanced student's learning process. During user testing phase, most of them expressed the effectiveness of this courseware compared to the conventional black board approach.

✓ User Friendly

A Help module is included throughout the courseware to aid and guide the user. Short and precise explanation is given for better understanding on the navigation methods and the functions of various buttons found in this courseware. Another aspect is to leave the screen clutter free so as not to confuse the user. Proper placement of the navigation buttons in permanent and touchable grid allows the user to click the buttons with ease.

✓ Audio

The inclusive of audio in the form of sound, open screen music helps to brighten the execution of the courseware to life, and add a touch of reality to it.

It manages to reduce the monotonous task of reading and increases the concentration level of users. It expends the conveying of the meaning of the contents of the courseware and gives it an important new dimension.

✓ Timeliness

Computers are always ever ready when the user is. These reduce the dependency on teachers and allocate bigger space for self-learning or independent learning. As a result, this allows teachers to spend more time on selected topics and on personal interaction with students' purposes.

✓ Self pacing

Students can progress through the lessons at their own pace. Intellectual students may finish this courseware faster than the slow learners. They learn according to their mental ability, review difficult section and even request additional practice whenever necessary. Students are motivated and personally involved.

In addition, interactive learning through multimedia is an effective learning approach for discovering principles. Students learn how to operate a computer while they go through this courseware.

✓ Active Learning

Users are able to repeat the courseware as many time as they want. Slow learners might have better chance to understand the content as computer-based learning has infinite patience compared to the teacher.

However, users must engage in some processes in order to learn through the courseware. It is designed to foster active student participation and requires frequent response from the student as information is presented. Once the student responds, the computer can immediately indicate whether the response is correct or incorrect.

8.5. System Constraints

For this courseware, certain limitation were sighted and noticed during development and testing phase.

1. **Administrative Management**

   Due to its design characteristic, text presented and questions in Quiz module are static. This means that the contents are not changeable in the form of execution file. This limits the scalability of dynamic scope specification in content and questions.

2. **Sound and Background Music**

   Most audio files were compressed to reduce the storage space. This however produced poorer quality of sound as trade-off. Certain files are kept in 8-bit depth with mono setting. Thus causes poor sound system and a certain level of interference and echo in the background.

3. **No Editing Function**

   In this courseware, all the editing function such as copy and paste were also unavailable. Thus, users are unable to copy the images in this courseware for other use.

4. **Slow Respond Time**

   Although many of the images were compressed, some of the images in the courseware are not compressed especially in Interactive Module in order to preserve the quality of the image. The large size of the particular image will cause slow loading and respond time in some movie.

5. No Dictionary

Although the targeted group for this courseware is primary student, some of the vocabulary used in this courseware is hard to understand for the primary student's level. However, the words cannot be replaced by other simpler words in order to maintain the accuracy when delivering the knowledge to the student. Thus, the unavailability of online dictionary is a great limitation of this courseware.

8.6. Future Enhancements

New technologies are constantly emerging. It often takes many years for an emerging technology to achieve widespread use in the market place.

CAL for English Idioms can be further improved to achieve its goal of becoming effective educational software by today's standard. The suggestion improvements are as follows.

1. Keeping Track of Users

CAL for English Idioms should provide security features and a login function that will keep track of users. Students will be able to use the courseware and the progress of each student will be recorded in a log file.

The stages of student's progress will also be recorded once the student has visited a particular page, unit or module. This information will be saved and may be retrieved when the student logs in again.

2. Administrative Module

An administrative module can be incorporated into the system. This would enable teachers to keep track of students, monitor their progress and update the courseware content from time to time. Templates can be built to help teachers update the quiz and lesson module.

3. Graphical and Animation Enhancement

Further enhancement could be made to enhance the lesson content, graphics and animation. Probably with the availability of animation software, animation sequences would be produced more effectively. This goal is possible to achieve with the help of Macromedia Flash and Macromedia Director 7.0.

4. Web Enabled

To further wide spread the coverage of this courseware, web is the most effective way. By incorporating Macromedia Web-enable Tools like After –Burner and ShockWave, this application can be installed on web-server for access through World Wide Web (www). The data transfer speed via Internet must relatively fast and the size of enhanced (shocked) courseware must relatively small. Macromedia Director 7.0 can convert the movie to a shockwave file efficiently. It can upload the movie on web.

5. Random Quiz Questions

Random questions may also be added into the Quiz module. This could be developed in several levels to make it more interesting and challenging for the students. Bookmark or check box may be included to notify users that they have done a particular quiz set and should proceed to the next level, which they have not attempted.

6. More Games

Games should be developed in future such as crossword puzzle, jigsaw puzzle, coloring page etc. The increase in the number of game will make the courseware more interesting and draw more student attention.

8.7. Knowledge and Experience Gained

The final year project is solely an independent project to be undertaken by undergraduates as partial fulfillment of the requirement for the Bachelor of Computer Science.

Two semesters are allocated for us to conduct initial studies, analysis, design and implementation, testing and delivery. Advises and guidance provided by the supervisor are really helpful.

The sole purpose of this project is to train undergraduates in the ability and efficiency in developing a working system based on the little allocated. The process of undergoing all the various phases of system development definitely do provide valuable experience.

In addition, this project will enrich undergraduates' knowledge and understanding of the computer science theories and technology.

In brief, my personal experience acquired during this project development include:-

i) Developing a mature and independent personality.

ii) Enhanced communication skills and self-confidence.

iii) Resolving technical problems arise with the best solution.

iv) Learned new skills in authoring multimedia package.

v) Propose, plan, outline schedule and set milestones to ensure on-time delivery.

vi) Being resourceful in acquiring information, research and solution pertaining to the project.

vii) Acquired experience in public speaking and conducting effective presentation.

REFERENCE:

1. Geoffrey, R., Heimy, F. and James, P. *Using Computers in Teaching Foreign Languages*, Englewood Cliffs, Prentice Hall, Inc. 1995.
2. MSDN Library Visual Studio 6.0
3. Mauer, Lowell, *SAMS Teach Yourself Visual Basic 6 in 21 Days*, , Indiana, Macmillan Computer Publishing, 1998
4. Pressman, R.S., *Software Engineering : a Practitioner's Approach*, New York, McGraw Hill, 1992.
5. Keller, Arnold, *When Machines Teach – Designing Computer Courseware*, New York, Harper & Row, Publisher Inc., 1987

CHAPTER 9 Summary and Conclusion

CAL for English Idioms is a multimedia educational courseware designed for beginning English learners. It covers a large collection of English idioms and will let the users learn the meaning of English Idioms, and know how to use them. It is interactive and it uses multimedia elements to encourage learning through interaction between the computer and the user. CAL for English Idioms includes three major functional modules: Learning, Interactive and Quiz and Test.

Basically, CAL for English Idioms is aiming to achieve the objective of covering the parts that the teachers have left out in school. It also try to let those who begins to learn English don't took English Language especially English idioms as too much a hardship for them. In addition CAL of English Idioms also help to fuse the latest in technology with the best thinking in education to individualized instruction and permit a person to learn at his own rate and up to his full potential. CAL for English Idioms also aim to utilize the knowledge, experience and skill of experts' teachers for the purpose of creating units of instruction, which effectively employ the instructional computer system in combination with other appropriate media to improve and individualize the instructional process.

The Learning Module in this package will teach the user what some of the common seen idioms means and give an example to the user to let him know how the idioms was used in sentences. To strengthen the user's memory and understanding of the English Idioms, the Interactive Module is implemented in order to achieve this goal. Humorous presentation was displayed to attract the user's attention towards certain idioms and also to let them understand how the idioms are supposed to use correctly. A good picture means more than a thousand words. So, elements of multimedia such as voice and images are used to develop this Interactive Module. Finally, the Quiz and Test Module will examine whether the user knows and understands what he has learned.

Overall, CAL for English Idioms has achieved and fulfilled some of the major objectives and requirements as it had determined during system analysis. It provides interactive and easy learning of English, particularly Idioms.

There was a lot of knowledge gained throughout the development of the application. These include system development, animation creating, multimedia technologies, image editing and sound editing. Using Microsoft Visual Basic 6.0 has proven to be a valuable experience, while good software engineering techniques must be applied. As well, theories and knowledge gained throughout the course of computer science studies like system analysis, design and software engineering were literally implemented into practice.

Finally, there is still much for improvement in CAL for English Idioms in terms of implementing a comprehensive interactive learning package. With the first step taken, enhancements could still made with more features added for future versions.

In conclusion, this project has met its chief objective of developing an educational multimedia courseware. The knowledge gained would indeed be beneficial and might pave the way to developing other system in the future.

APPENDIX A:

COMPUTER ASSISTED LEARNING (CAL) FOR ENGLISH IDIOMS

USER MANUAL

Chapter 1
Introduction

Thank you on using CAL for English Idioms. We appreciate you for choosing this multimedia educational package to meet your learning needs. CAL for English Idioms is compact, easy to use, attractive, and offers excellent learning opportunity for you or your children. We hope you will be satisfied with this multimedia educational package.

How to use this manual

The user's manual contains basic information about the courseware, such as setup procedure, basic operation, the overview, modules, troubleshooting and so on. Read this manual carefully in order to get the most out of your courseware. The manual consists of 7 sections.

Chapter 1 Introduction

Introduces how to use the user's manual

Chapter 2 Setting Up

Gives instruction for setting up, hardware and software requirements and other setting up information.

Chapter 3 Overview

Gives the general overview and quick reference of this courseware

Chapter 4 Getting started with CAL for English Idioms

Gives the basic information on starting the courseware.

Chapter 5 Modules

Gives the basic information about each every module in the courseware and how to use it.

Chapter 6 Troubleshooting

Gives some instructions for solving common problems. If you have any difficulties, refer to this section.

Chapter 2

Setting Up

System Requirement

Before installing CAL for English Idioms, please make sure that your computer meets the following minimum requirements,

Hardware and Software Requirements

PC:

- ✓ Pentium with 200MHz processor or higher.
- ✓ 4X CD-ROM drive or faster
- ✓ A mouse
- ✓ 32 MB RAM or higher
- ✓ SVGA support (640 x 480 / hi-color)
- ✓ Audio playback capabilities
- ✓ Speakers
- ✓ Windows 95 or later (for Windows OS) or
- ✓ 30 MB of available Hard Disk space

CAL for English Idioms Installation Guide

CAL for English Idioms requires at least 30MB of Hard Disk space for installation.

- For Windows 95 or later, insert the disc, the program will run the setup for installation automatically.

- If the system failed to start automatically, double click on the setup icon found inside the disc.

Display Setting

To get the optimum viewing satisfaction, the following display setting should be used.

√ Desktop Area : 640 by 480 pixels

√ Colour Platte : High Colour (16 bit) or higher

To check whether you already running your computer on those setting or to change your current settings, go to *Control Panel* and choose *Display*. Then choose the *Settings* tab and make the necessary changes.

Chapter 3

Overview

CAL for English Idioms is a multimedia educational courseware. It is fairly easy to use and consist of 3 modules.

- ✓ Choose "**Lesson**" to learn about the collection of idioms available.
- ✓ Choose "**Interactive**" to spend time learning how idioms are use in daily life.
- ✓ Choose "**Quiz**" icon if you wish to test yourself

This courseware is suitable for primary school students who would like to learn more on using English idioms as well as to those children who are interested in knowing about the meaning of an idiom.

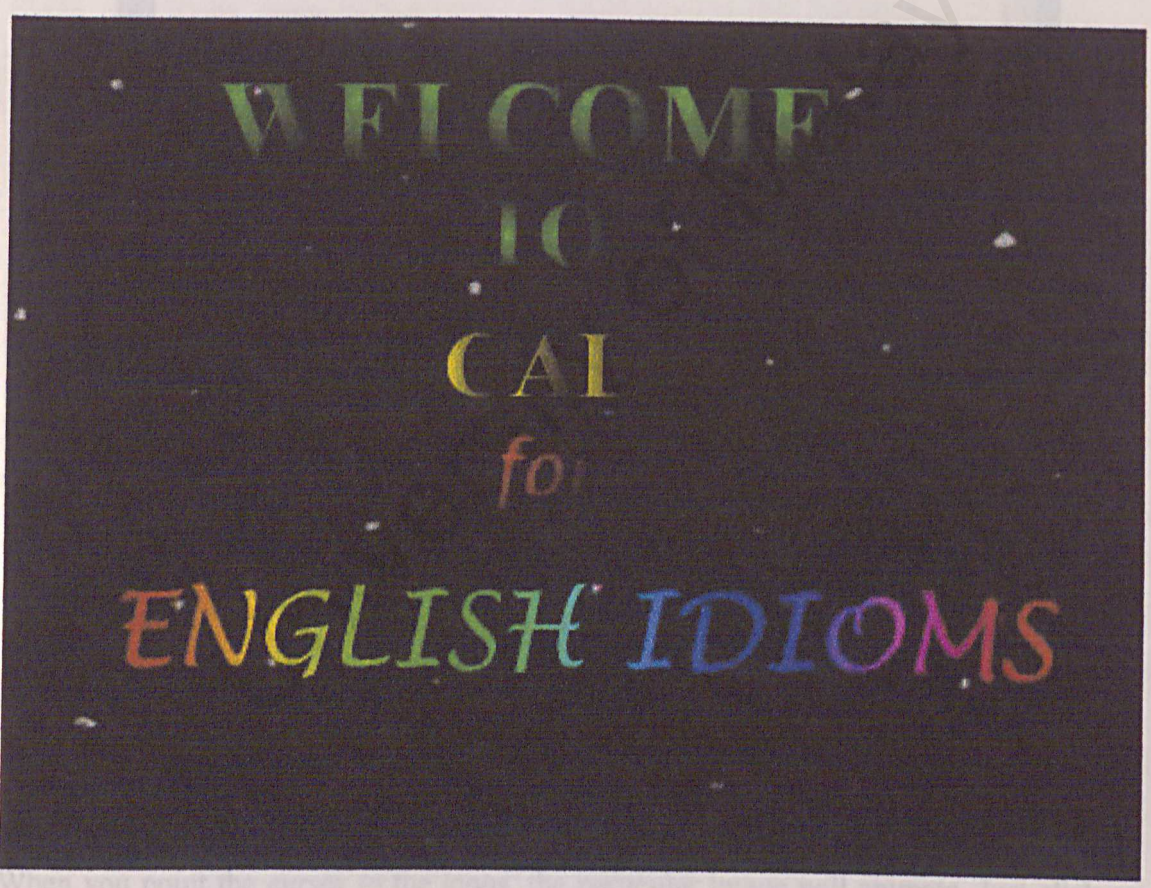
For each selection of the command button, there will be a tool tip text when the cursor moves over the command button.

Chapter 4

Entering CAL for English Idioms

Entering CAL for English Idioms

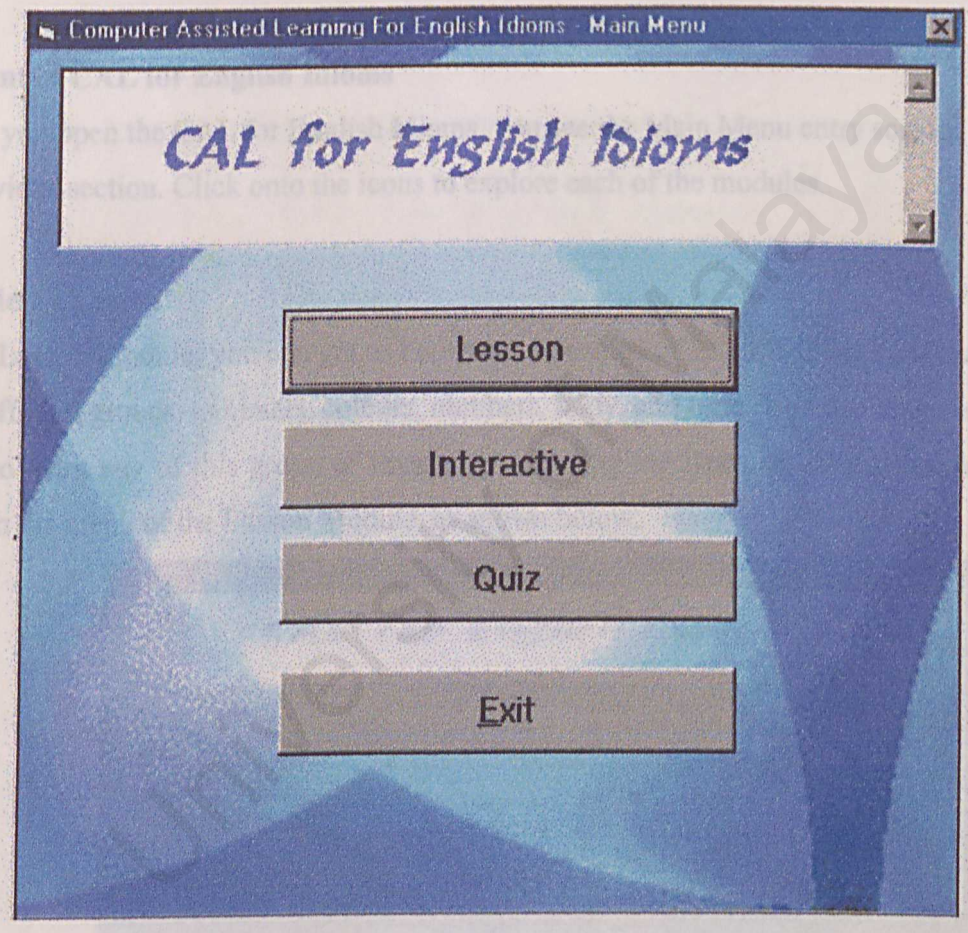
The first screen you will come upon entering CAL for English Idioms is the Welcome screen. Then, a short session of open screen will be displayed before entering to the Main Menu.



The Open Screen

The Main Menu

The main menu screen lets the users choose the module to visit. Point the mouse to each of the buttons to select.



The Main Menu Screen

When you point the cursor to the icons, the particular image will animate. Just click on the icon to enter the selected module (for further information of each module, refer to Chapter 5 Modules).

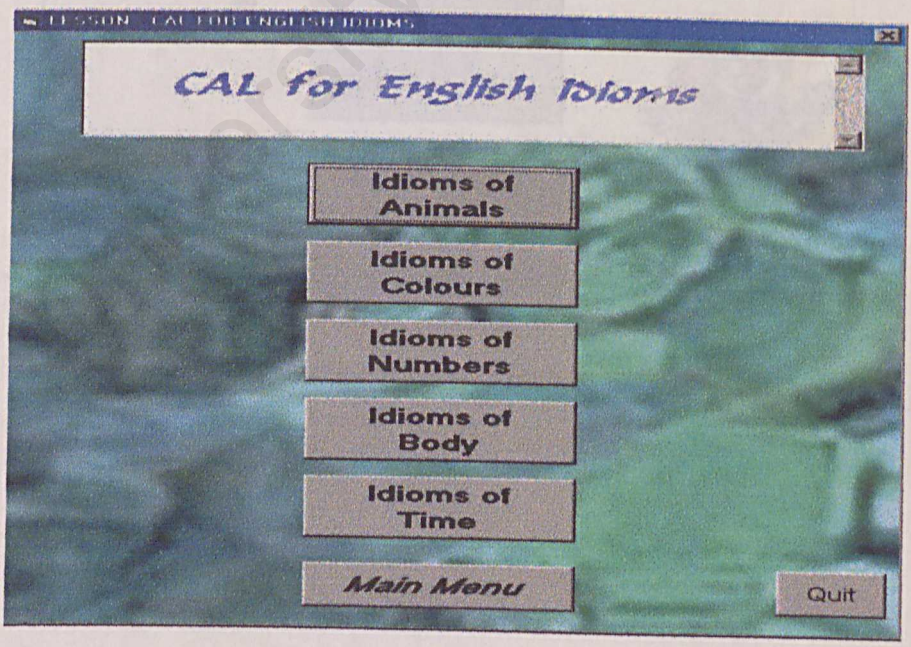
Chapter 5
Modules

Content of CAL for English Idioms

When you open the CAL for English Idioms, you see the Main Menu entry screen, shown in previous section. Click onto the icons to explore each of the modules.

Module 1 : Lesson

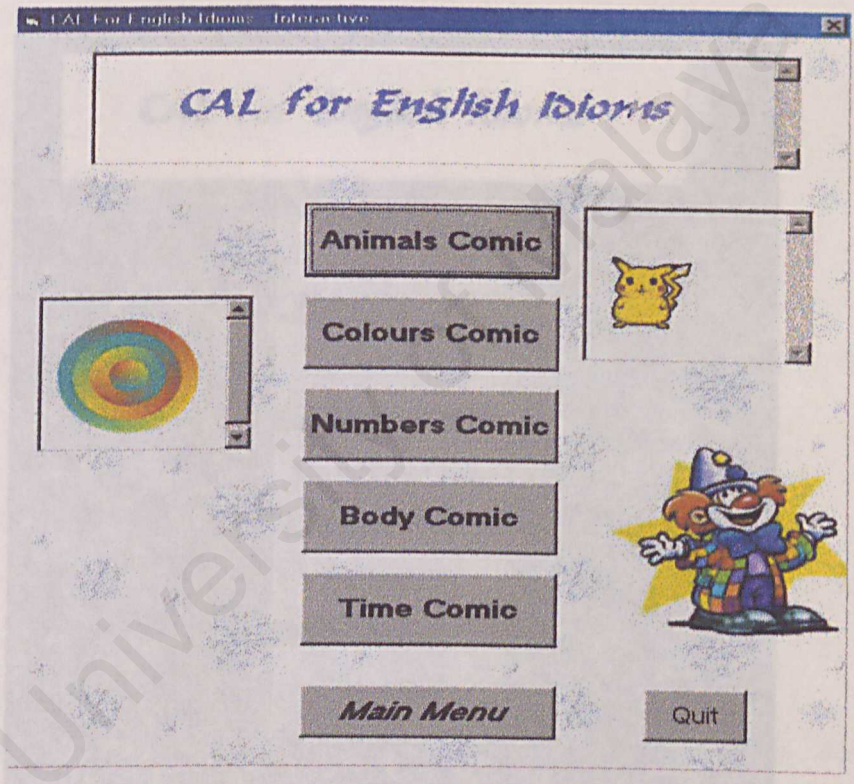
In the Lesson Module, you can get to know the meanings of English Idioms according to five different groups – animals, colours, numbers, body, and time. You can make up your mind to learn any of this group of idioms by selecting the types of idioms you want to learn in the menu of the Lesson Module, as shown below:



The Lesson Menu

Module 2 : Interactive

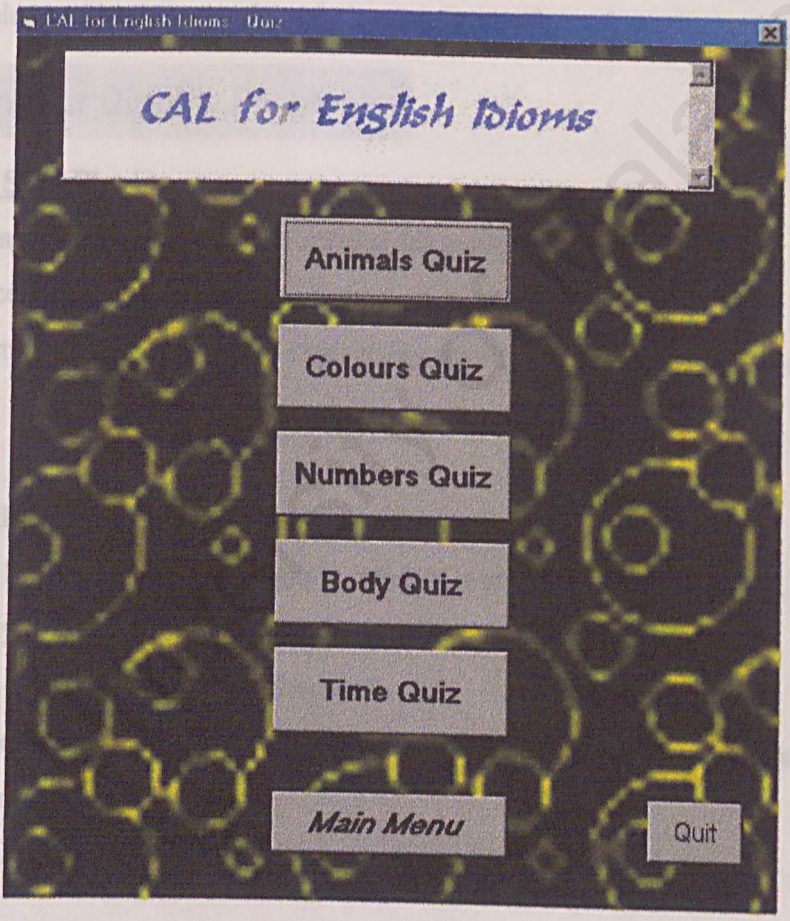
Selecting Interactive Module will lead you to the world of cartoon where the animated characters in this module shows you how they make use of English Idioms. Also, this module provides a menu for selection of which type of Idioms the users want to see. The figure shown below is the menu screen for the Interactive Module.



Interactive Module Menu

Module 3 : Quiz

Selecting Quiz Module will test your level of understanding on English Idioms. There will be a set of quiz available for every different group of idioms. The questions are given in the form of multiple choice. The menu screen for the selection of question is shown below.



Quiz Module Menu

Chapter 6

Troubleshooting

CAL for English Idioms is generally trouble-free. In most cases, problems can be traced to one of three things: video / monitor display problems, audio / sound problems, or memory problems. Check each of the following items if you face any problems.

Video / monitor Display Problems

Animation Stop Playing

Try decreasing the hardware acceleration for your display adapter.

Hardware acceleration specifies the degree of acceleration you want for your graphic hardware. In many cases decreasing this setting may resolve some problems in displaying graphics.

To decrease the hardware acceleration for your display adapter

- ✓ Click **Start**, point to **Settings**, click **Control Panel**, and then double-click **Display**.
- ✓ On the **Settings** tab, click **Advanced**.
- ✓ On the **Performance** tab, move the slider bar to lower the **Hardware acceleration** setting to **None**.
- ✓ Click **OK**, then click **OK** again to return to **Control Panel**.

⁑ Improve the Video Display

You can operate CAL for English Idioms with a screen resolution of 640 X 480, but an 800 X 600 or higher resolution is recommended. If your resolution is set at 640 X 480, images may not be displayed properly.

CAL for English Idioms requires that you set your computer to display 256 color or higher. If you receive any message that mentions 256 color or if images won't print properly you should increase the number of colors displayed.

To optimize your computer display for CAL for English Idioms:

- ✓ Click the **Start** button and point to **Settings**.
- ✓ Click **Control Panel**, and then double-click **Display**.
- ✓ Click the **Settings** tab.
- ✓ Select **256 colours, High Colour**, or **True Colour**.

Note:

CAL for English Idioms will not run in 16-colour mode. Unless you have a VGA-only video card or monitor, you can change your computer settings

.

- ✓ If necessary, move the slider to at least **800 by 600 pixels**, and then click **OK**.

Audio / Sound Problems

⁑ There is No Sound

To determine why you are not hearing sounds, use the following methods in the order they are presented.

Ensure that your computer has a sound card.

If you have a sound card, you'll see its name on the list.

If you do not have a sound card and want to install one, contact your computer dealer.

Check volume control in Windows

To check volume control in Windows 95 or later

- ✓ Click the **Start** button.
- ✓ Point to **Programs**, point to **Accessories**, point to **Entertainment**, and then click **Volume Control**.
- ✓ Examine the volume levels for the various components listed, and adjust the levels if necessary.

Check the volume control of your hardware

- ✓ Check that the speakers are plugged into the computer and into the outlet and that the volume is turned up.
- ✓ Check the volume control on the speaker.
- ✓ Check the CD-ROM drive volume control.
- ✓ Check the sound card volume control. If it has one, it should be located in the back of the computer where the speakers plug in.

ℵ Animation / video Don't Display Sound

There may be a hardware device conflict on your computer.

- ✓ To verify that the device is present on the **Device Manager** tab and that there are no conflicts
- ✓ Click **Start**, point to **Settings**, click **Control Panel**, and then double-click **System**.
- ✓ On the **Device Manager** tab, verify that the device is present and that there is not an exclamation point in a yellow circle next to it. If a device has an exclamation point in a yellow circle next to it, the device may be using the same settings as another device in your computer.

- ✓ If you see an exclamation point in a yellow circle:
- ✓ Double-click the device, and then click the **Resources** tab.
- ✓ Look in the **Conflicting device list** for resource conflicts. If a resource conflict exists, eliminate the conflict by configuring one or more of the devices to use different resources. For information about how to do so, consult the device documentation or manufacturer.

Memory Problems

Memory Error Message When the Program is Running

CAL for English Idioms uses the random access memory (RAM) of your computer to display pictures and play sounds, animations, and videos. If you receive messages about not having enough memory or if the program runs slowly, try one or more of the following procedures.

Enable additional virtual memory.

- ✓ Click **Start**, point to **Settings**, and then click **Control Panel**.
- ✓ Double-click **System**.
- ✓ Click the **Performance** tab.
- ✓ In the **Advanced Settings** section, click the **Virtual Memory** button.
- ✓ Select **Let Windows manage my virtual memory settings** (Windows 95/98only)(Recommended)

Increase the minimum and maximum virtual memory.

- ✓ Quit all unnecessary programs.
- ✓ Clean up ("defragment") your hard disk. Run a clean up program such as Disk
- ✓ Defragmenter, which is included with Windows 95/98.