Multimedia Courseware for Developing Business Intelligence

By

Isabelle Chia Chai Yuin

A PROPOSAL

SUBMITTED TO

Universiti Tunku Abdul Rahman

in partial fulfilment of the requirements

for the degree of

BACHELOR OF INFORMATION SYSTEM (HONS)

BUSINESS INFORMATION SYSTEM

Faculty of Information and Communication Technology

(Perak Campus)

MAY 2014

UNIVERSITI TUNKU ABDUL RAHMAN

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DECLARATION OF ORIGINALITY

I declare that this report entitled "**MULTIMEDIA COURSEWARE FOR DEVELOPING BUSINESS INTELLIGENCE"** is my own work except as cited in the references. The report has not been accepted for any degree and is not being submitted concurrently in candidature for any degree or other award.

Signature : _____

Name : _____

Date : _____

ACKNOWLEDGEMENTS

Sincerely thanks to everyone who helped to complete the report. Special thanks to the project supervisor - Ms. Chuah Min Hooi who had given the golden opportunity to do the project on the topic "**Multimedia Courseware for Developing Business Intelligence**". The project supervisor had given a lot of encouragement and support to overcome problems and cope well when challenges are faced.

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Finally, it is a great rejoice to thank Ms. Ong Yi Fen and Mr. Goo Wah Theng for providing useful idea, suggestion and valuable feedback to help to complete the Final Year Project.

ABSTRACTS

The purpose of the project is to develop a Multimedia Courseware for Developing Business Intelligence for UTAR Students. The main objective of the project is to help UTAR students who take the subject UCCB3103 Business Intelligence Information System to study effectively in a fun and interactive way.

The project is able to show animation with audio and visual effect to attract the interest of students in studying the subject. The courseware which includes 6 modules which are Lecture Module, Learning Module, Tutorial Module, Quiz Module, Test Module and Game Module can help students have more understanding in the subject. The aim of the project is to help students score better grade in their final exam.

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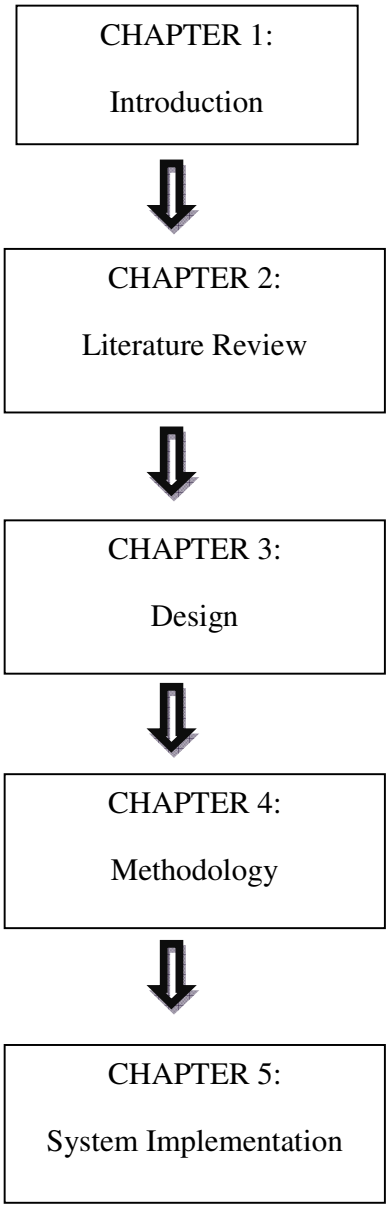
LIST OF ABBREVIATIONS

BI	Business Intelligence
UTAR	Universiti Tunku Abdul Rahman
MICS	Multimedia and Interactive Courseware System
ADbC	Animated Database Courseware
LCA	Lessons-Constructor-Analyzer
ER	Entity Relationship
SQL	Structured Query Language
PHP	PHP: Hypertext Preprocessor
HTML	HyperTextMarkup Language
CSS	Cascading Style Sheets
MySQL	My Structured Query Language
CBT	Carotid Body Tumor
ISD	Instructional Systems Design

ORGANIZATION OF THESIS

This thesis comprises of nine chapters. This section describes the content of those chapters.



CHAPTER 6:

System Testing

CHAPTER 7:

Conclusion

CHAPTER ONE

INTRODUCTION

This chapter presents brief overview of the motivation. This followed by the research problem statement, project scope, project objectives, impact, significance and contribution of the research and background information. Finally, this chapter concludes with a brief outline of this thesis.

1.1 Motivation

The main aim of the project is to develop a multimedia courseware for UTAR students who take the subject UCCB3104 Business Intelligence Information System to learn effectively in an easier and interactive way because the traditional way for studying a subject is dull and boring.

1.2 Problem Statement

After some analysis and research, there is no multimedia courseware for Business Intelligence in UTAR. As Business Intelligence is a theory-based subject, students tend to be less interested in. This is because students will easily get bored while attending lecture class as lecturers will try to explain as detail as possible in order to let students to understand the whole concept of the subject.

Besides, the lecture notes for theoretical subject will be in mostly text-based and students will easily get tired when reading it. As Business Intelligence contains practical session, students might be difficult to catch up while attending practical class as time is limited and the facilities like computers in the lab is relatively slow.

1.3 Project Scope

The project includes a total of 6 modules which are Lecture Module, Learning Module, Tutorial Module, Quiz Module, Test Module and Game Module.

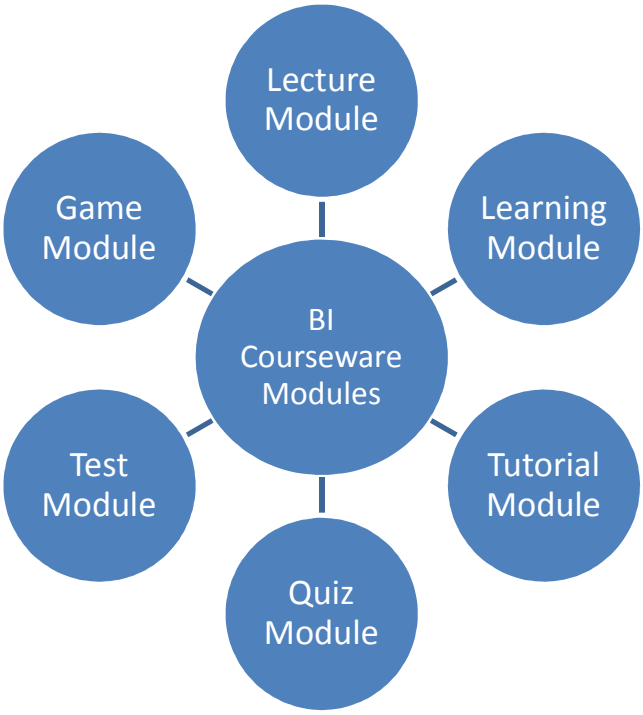


Figure 1.1 Types of Modules in the Business Intelligence Courseware

1.3.1 Lecture Module

- Animation with visual and audio effect to show user how to use IBM Cognos 10 software

1.3.2 Learning Module

- Contains 4 topics from Business Intelligence subject in the module
- Slide with text with visual and audio effect
- Important points and summary at the end of each chapter

1.3.3 Tutorial Module

- Set of tutorial question contained of 10-20 question for each chapter
- Objective question
- Answer checking after finish and submit the tutorial

1.3.4 Quiz Module

- Short question with time limit to answer
- Combination of several topics
- Less than 10 questions

1.3.5 Test Module

- Pass year questions like simulated Exam
- Time limit to 2 hours per test(countdown function)
- Answer checking and marks calculating to assign grade after each test

1.3.6 Game Module

- Puzzle game related to learning module
- Many levels to complete to achieve the whole game
- Fun way to test the understanding after studying

1.4 Project Objectives

1.4.1 To develop an interactive multimedia courseware for UTAR students to learn Business Intelligence effectively

- The multimedia courseware will help students to study Business Intelligence more effectively with a fun and more interesting method of study as it contains of audio, video and animation to attract the interest of students.

1.4.2 To study the functionality and module in different courseware and benchmark with the proposed courseware

- To develop a courseware with useful functionality, first must understand the current existing courseware. Study and analyze the functionalities among different courseware to support the proposed courseware.

1.4.3 To design a suitable interface and functionalities in order to develop an interactive multimedia courseware for UTAR students to learn Business Intelligence effectively

- For developing a courseware, design is very important. This is because every task including coding and implementation until the final stage are related to design. So, the need to design a proper courseware functionality to match the requirements will be a helpful step to develop a useful courseware.

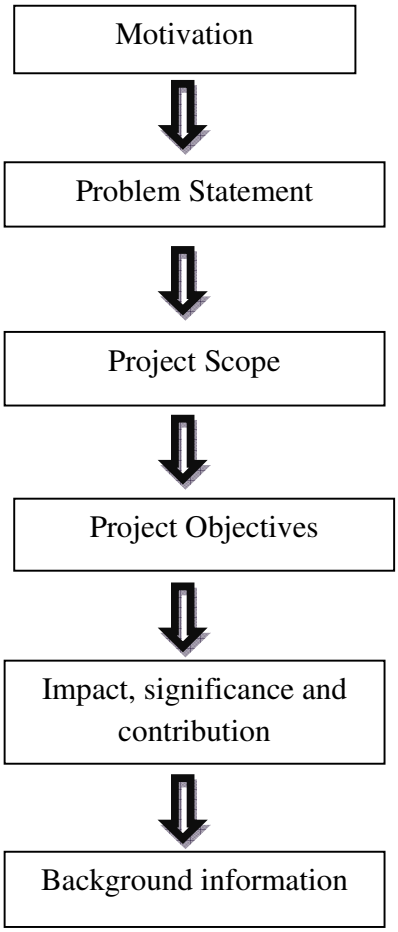
1.5 Impact, Significance and Contribution

The project will contribute to students who take the subject UCCB3104 Business Intelligence Information System. By having the courseware, the students will have more interest in study as it is fun compare to traditional study method that only contains lecture notes with text. Thus, students can study effectively and results in better grades in their final exam.

Besides, students can study the topics that not yet been teach and also revise the topics after study as there is a learning module and lecture module with detail step-by-step guide to teach students. By using the courseware, Students can take the quizzes anytime when they are free at home and also play game while improving their understanding of the subject in the same time. As the game module in the courseware consists of many levels, students will feel challenged if others completed more level than them. As a result, they will try to complete as many levels as possible. This will let students to use their free time in a more useful way instead of playing other online games.

1.6 Project Background

The project focuses on the development of a multimedia courseware of the subject Business Intelligence used in UTAR for undergraduate student who enrolled in Faculty of Information Technology and Communication. The multimedia presentation during lecture used in university by lecturer is called passive use of technology. However, if a student can control the multimedia visualization is an active use of technology. The project purpose is to encourage students to study by active use in technology. Many students tend to study in a more interactive way. Interactive way means including animation, visual, audio, video sense of study and also can get to control and interact with the study materials. By using courseware in the aid of study with multimedia elements, this will increase the students' interest of study and to attract students by a more fun and effective way to study Business Intelligence.


Motivation
Problem Statement
Project Scope
Project Objectives
Impact, significance and contribution
Background information

CHAPTER TWO

INTRODUCTION

This chapter presents brief overview of the literature review. This followed by the research fact finding, data collectionandcritical remarks of previous works. Finally, this chapter concludes with a brief outline of this thesis.

2.1 Literature Review

2.1.1 Web-Based Interactive Courseware for Information Security

In benchmark model 1 proposed by Andy Wang JuAn(Wang 2005), the courseware was developed by using MICS architecture where MICS is a multimedia and interactive courseware system that let users to customize their own courseware. The courseware in benchmark model 1 is to teach Information Security in university level. It can be runs over network with standard Web browser. The courseware contains interactive animation to enhance students' learning. The technology used to implement MICS is Macromedia Flash and ActionScript 2.0. In MICS, there are 3 major modules which are lesson builder, quiz builder and game builder. Lesson builder is to create slides for the lesson that included in the subject that can contain audio or video effect. However, there is no any tutorial module to let developers to create tutorial question for each chapter. So, students cannot do exercises after studying each chapter. The quiz builder is to create quizzes to support the lessons with different styles of questions like multiple choices, true or false, fill in the blanks and short-answer question but does not contain test module that can create set of test question with time limit to test students for their overall knowledge of the subject. So, students cannot evaluate their grade before sitting the final exam. For the game builder, it is to create game to support the lesson with different types of games like puzzle game, action games and adventure games. However, it is a web-based courseware so without internet, students cannot do anything with it.

2.1.2 Work in Progress-Lessons-Constructor-Analyze Paradigm (LCA) and the Animated Database Courseware (AdbC)

In benchmark model 2 proposed by Mario Guimaraes and Meg Murray(Guimaraes & Murray 2009), the courseware named Animated Database Courseware (AdbC) was developed by using a paradigm called Lessons-Constructor-Analyzer (LCA) to support the teaching and learning of database concepts. AdbC has a learning component called Lessons that include anything from introductory tutorial with animations for students to study by their own. However, Lessons only let students to study by passive learning where students only visualizing instead of trying out new ideas. So, it should be integrated with Construction and Evaluation/Analyzer but the courseware is not intended to be used in isolation. This means it needs to incorporate into classroom and physical lectures and labs. For Construction component, it contains a tool for constructing ER Diagrams to support the learning of database. Besides, the courseware contains 9 exercises where students can identify the ER Diagram based on given scenarios and also other exercises related to Lessons. Moreover, the courseware also consists of Interactive SQL lab in the Constructor components. There is also a 25 quiz question related to SQL where students can summit their answers by getting feedback in every question. It also has on-line quizzes so it has the need of using the internet. Without network, students cannot summit their answers. Although LCA paradigm contains 3 components which are Lessons, Constructor and Analysis, but AdbC only focus on Lessons with animations and Constructor components. AdbC does not have test module to let students to evaluate their grade. Besides, it also does not contain game module to let students to learn while

playing. AdbC contains many animations, but it does not have any audio or video. This will cause boredom when using the courseware as it is less interesting.

2.1.3 A Case-based Data Warehousing Courseware

In benchmark model 3 proposed by Manashree Kulkarni, Meiliu Lu and Du Zhang (Kulkarni et al. 2010), the courseware is a case-based data warehousing courseware which can help beginner data warehousing designers to reinforce key concepts of data warehousing using a case study approach. The courseware contains features like report generation, knowledge assessment, tool evaluation and illustration interaction. The courseware tool is a 3-tier web application designed by using PHP, HTML, CSS and JavaScript and supported by MySQL queries and stored procedures. Its data from data sources resides on a MySQL Server. The courseware contains sounds, text, diagram and ready-to-go query runs but it does not have any video in it. The courseware has the explanation of the theory behind each topic that means users can study the theory before they continue with the case study. However, it does not contain any tutorial to let user to do exercise after completed each topics. The courseware in benchmark model 3 also has quiz module in it which is provide for self-evaluation but does not contain test module to let users to have a complete evaluation of whole subject with providing grade before sitting for final exam. Nevertheless, the courseware also does not contain a game module. This reduces the attraction of using the courseware as users cannot learn and have fun in the same time.

2.2 Definition of Multimedia

Table 2.1 Definition of Multimedia

Authors	**Definition**
Random House Dictionary (Random House 2014)	The combined use of several media, as sound and full-motion video in computer applications.
Collins English Dictionary (Collins English 2009)	The combined use of media such as television, slides, etc, esp in education.
Denis Howe (Howe 2010)	Any collection of data including text, graphics, images ,audio andvideo, or any system for processing or inter acting with such data.Often also includes concepts fro m hypertext. Interactively.

2.3 Application of Multimedia in Education

In education, multimedia is used to produce computer-based training (known as carotid body tumor) and reference books like encyclopedias and yearbook. CBT allows the user about the particular topic by a series of presentations, text, and information related to the format of illustration. Edutainment is education and entertainment, especially when combined with multimedia entertainment.

Media convergence concept is also becoming a major factor is education, especially higher education. Defined as a separate technology such as voice, data and video, and now share resources, exchange, and collaboration and create new efficiencies. Media convergence is rapidly changing university courses around the world. Likewise, it is changing the availability or lack of technical skills which need to work smart thing.

Multimedia teaching will bring the students as a class, they can interact with the teacher and themes. Multimedia teaching is more intuitive than the old method, teachers can simulate real-life situations. In many cases, teachers do not have to be there, the students will learn themselves in the classroom. More importantly, teachers will have more ways to stimulate students' enthusiasm for learning.

2.4 Fact Finding

The following questions are a questionnaire prepared to collect information about students' study method and the feedback of subject from the current semester students who take the subject UCCB3103 Business Intelligence Information System. The questionnaire is distributed to a total 8 students from the class.

Survey for Students Taking UCCB3103 Business Intelligence Information System

1. Do you like to study?

    a) Yes
    b) No

2. Do you find this subject (UCCB3103Business Intelligence Information System) is difficult to study?

    a) Yes
    b) No

3. Based on your answer in the first question. Justify why. You may choose more than 1 answer.

    - It is a theory subject
    - The lecture notes are full of words
    - There are many difficult terms in the subject
    - Need to memorize many important sentences
    - It is an easy subject
    - The subject is interesting

4. The subject contains lecture and practical session. Which session you prefer?

    a) Lecture
    b) Practical

5. Do you satisfied with the performance of the computers in UTAR computer lab?

    a) Yes
    b) No

6. Would you like to try if there is a new study method?

    a) Yes
    b) No

Courseware is a term that combines the words ‘course’ with ‘software’. It was used to describe additional educational material intended as kits for teachers or trainers or as tutorials for students, usually packaged for use with a computer.

7. Have you use any courseware before?

    a) Yes
    b) No

8. Do you think a multimedia courseware which contains audio, video and animation can attract you to study more effectively?

    a) Yes
    b) No

9. If a courseware have subject related game feature in it, will you spend time on playing the game inside instead of playing other games?

    a) Yes
    b) No

10. Do you think the use of courseware can replace the traditional study method?

a) Yes
b) No

2.5 Data Collection

The data collection is from the current semester students who take the subject UCCB3103 Business Intelligence Information System. From the survey, there is no one who choose they like to study. Besides, 7 out of 8 think that the subject is difficult to study and 5 out of 7 reason is it is a theory subject. Based on the result from the survey, students tend to be more prefer practical session but all of them are not satisfy with the performance of the computers in UTAR computer lab. Moreover, 8 out of 8 students are willing to try new study method but only 1 student used a courseware before. However, 5 out of 8 students think that a multimedia courseware which contains audio, video and animation can attract them to study more effectively and 4 out of 8 students are willing to spend time playing the game in the courseware instead of playing other games. Finally, only 2 out of 8 students agree with the use of courseware can replace the traditional study method.

2.6 Critical Remarks of Previous Works

Table 2.2 Strength and Weakness Analysis of Benchmark Model and Proposed Model

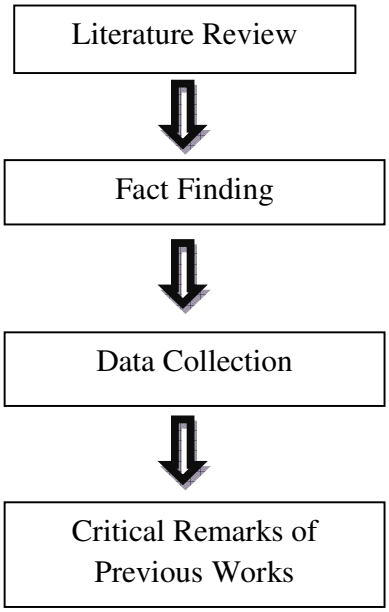
	Benchmark Model 1 (Wang2005)	**Benchmark Model 2** (Guimaraes & Murray 2009)	**Benchmark Model 3** (Kulkarniet al.2010)	**Proposed model (Multimedia courseware for developing Business Intelligence)**
I. Syllabus Topics - Learning Module (Slides with text)	Yes (Lesson builder)	Yes (Lessons)	Yes (Theory)	Yes (Topics involved)
-Lecture Module (Practical with step-by-step tutorial)	Yes	Yes (Lab exercise)	Yes (Case-study)	Yes (Lab practical)
II. Practice and Exercises -Tutorial Module (Tutorial question with answers)	No	Yes	No	Yes
-Quiz Module	Yes	Yes	Yes	Yes

(short question to test the understanding of the topics)				
III. Pre-exam -Test Module (Sets of past-year questions with time-limit and grade)	No	No	No	Yes
IV. Learning Through Entertainment -Game Module (Game related to syllabus topics with levels to complete)	Yes	No	No	Yes
V. Extra Features -Interactive Animation	Yes	Yes	Yes	Yes
-Audio	Yes	No	Yes	Yes
-Video	Yes	No	No	Yes
-Network-based	Yes	Yes	Yes	No
VI. The Users	Distance-learning,	Faculty and students	Undergraduate and graduate	Faculty of Information

	single parents and disabilities		students, beginner data warehouse designers and developers	and Communication and Technology undergraduate full-time and part-time students

2.7 Proposed Method

The proposed model contains most of the functionalities of all benchmark models have. Besides, the test module which does not exist in the above three benchmark models is major advantage of the proposed model. The test module which contains of different sets of past year question to let students to evaluate the overall understanding of the subject and estimates the grade that students can get in the final exam. By doing more pass year questions, students can easily track the question pattern that will be out in the final exam thus can scores higher grade in the exam. Besides, the proposed model do not have the need of connecting internet as it can be work and run even it is off-line. So, students do not need to be frustrated of searching for network or waiting for long loading if the network is slow. This helps students to save more time to concentrate in their studies by using the courseware.


Literature Review
Fact Finding
Data Collection
Critical Remarks of Previous Works

CHAPTER THREE

INTRODUCTION

This chapter presents brief overview of the system design. This followed by the courseware design and interface design. Finally, this chapter concludes with a brief outline of this thesis.

3.1 Courseware Design

The design of a courseware plays an important role because it is the most critical factor that affecting the quality of the system. The purpose of this chapter is to refine the interface design and the process flow of the prototype developed during Project I. The refinement process will be based on user feedback to make the courseware flow more smoothly and more user-friendly. Besides, it also enforces the interactivity between user and the courseware.

Figure 3.1 shows the process needed for courseware development. Thus, ADDIE Model is chosen to be the methodology for the project as each stage in ADDIE Model matches the design flowchart for the courseware development.

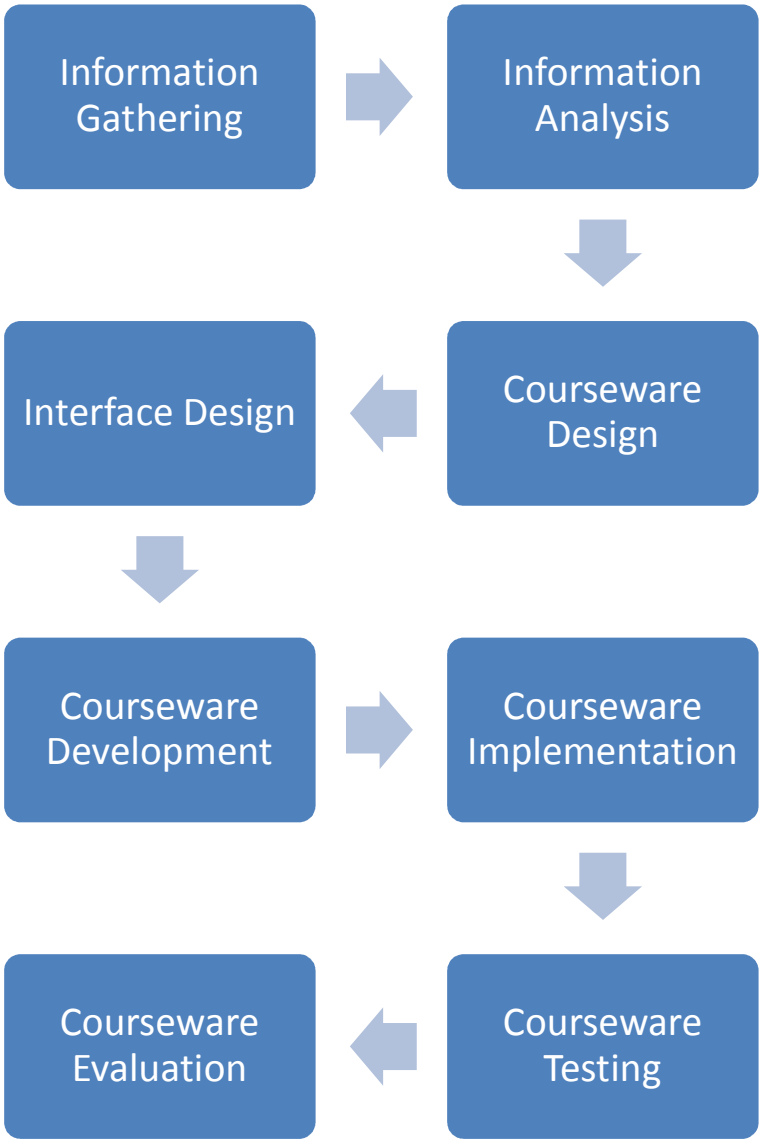


Figure 3.1 Design Flowchart for Courseware Development Process

3.2 Interface Design

Figure 3.2: Refined Design of Welcome Screen

Courseware Background

Background color before – Yellow color

Background color after – Purple color

Refined purpose – Purple color is chosen to replace yellow. This is because purple color will help in studies. Although yellow color can attract users attention but it is too bright while purple color can give a calm sensation and also will boost performance during study.

Menu button

Color before – Red background, black words

Color after – Light pink background, maroon words

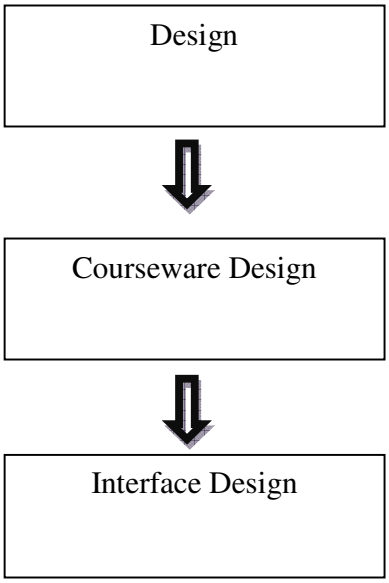
Refined purpose – Red color will have a contrast effect with yellow background but not purple. So, light pink color for the background of the menu button is chosen to match with the courseware purple background. Besides, Maroon color is chosen to replace black words to have a more clearer effect on the words to differentiate the title and the button.

Quit and Back button

Color before – Purple background, white words

Color after – Light blue color, red words

Refined purpose – As the courseware background has been changed to purple color, so light blue color for quit and back button will be applied for the changes of the color. Red color words is chosen is because it will create a contrast effect in color on the button.


Design
Courseware Design
Interface Design

CHAPTER FOUR

INTRODUCTION

This chapter presents brief overview of the methodology and tools. This followed by the research implementation issues and challenges, timeline and requirement specifications. Finally, this chapter concludes with a brief outline of this thesis.

4.1 Methodology and Tools

There are many development methodologies used in developing multimedia courseware. This kind of methodology is called instructional design. Instructional Design (also called Instructional Systems Design (ISD)) is the practice of creating "instructional experiences which make the acquisition of knowledge and skill more efficient, effective, and appealing. In the project, the chosen methodology is ADDIE Model.

4.1.1 ADDIE Model(udacun 2011)

The ADDIE model is a framework that lists generic process that instructional designers and developers use (Morrison2010). ADDIE Model contains of 5 phases which is Analysis, Design, Development, Implementation, and Evaluation. Figure 4.1 shows the process in ADDIE Model.

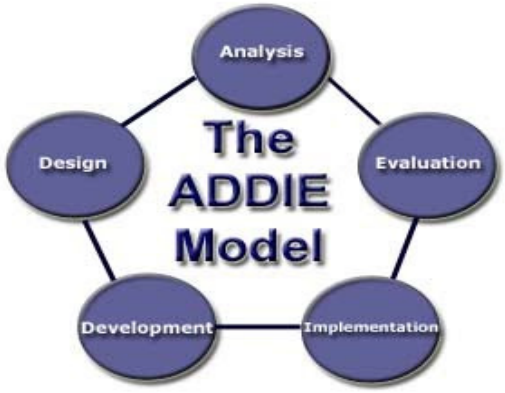


Figure 4.1 The ADDIE Model

ADDIE's five phases are as follows:

Phase 1: Analysis

- During the analysis phase, designers determine the goals and objectives and learning problems, the audience's needs, existing knowledge and skills. The analysis also consider as the learning environment, any constraints, delivery options, and the project schedule.
- Gather requirements from supervisor, list out all system and user requirements.
- Do interview with Business Intelligence students and lecturer to gather information about the syllabus and the ways to conduct the subject.
- Provide questionnaire to take feedback of what learning environment students willing to study in.

Phase 2: Design

- Specifies the systematic process of learning objectives. Detailed stories and prototypes tend to be, where the look and feel, graphic design, user interface and content determination.
- Design the interface of the courseware by drawing storyboard of each expected screen of the courseware.
- Design the functionalities that must be included in the courseware to meet user and system requirements.
- Create use cases to help in designing the courseware about what the users use, when and how.

- Design the interface by using Flash.

Phase 3: Development

- The actual creation (production) based on the design phase of the content and learning materials. Testers debug materials and procedures.
- Start to do the ActionScript in Flash according to module by module.
- Put in video, audio, interactive animations and other effects.
- Test the code and solve errors.

Phase 4: Implementation

- In the implementation phase, the plan is put into action, and to develop training for learners and teachers. Material delivered or distributed to student groups. After delivery, evaluate the effectiveness of training materials.
- Installation of the courseware.
- Teach students and lecturers how to use the courseware.
- Distribute to students and let them explore the courseware.

Phase 5: Evaluation

- This phase includes formative and summative evaluation. Formative evaluation is the run in every stage in ADDIE process. Summative assessment including test design criteria relevant reference projects and providing opportunities for feedback from the user. Revisions will be made when necessary.

- For formative evaluation, in each stage, deliverables must be done for supervisor. Follow up with supervisor to ensure the requirements are met.
- For Summative evaluation, gather the feedback after students try the courseware. The information gathered can help in future projects.

4.2 Implementation Issues and Challenges

Every project has its own difficulties and challenges during implementation. Those issues and challenges may lead to the project failure and may harden the process of development. In addition, it may impact project complete on time.

The main challenge of the project had faced is the need to go through a lot of article and read it many times until fully understand when doing research. Previously having no knowledge in Business Intelligence and developing a courseware. To solve the problem, the subject Business Intelligence Information System is taken to study and understand about what should be needed to include in the project. For developing the courseware, flash must be learnt through websites and text books.

In addition, time is a crucial factor. Time and tide wait for no man; a lot of time had been used in reading article. Therefore the time left to complete the project is shorter than others. The greatest challenge in the project is to complete the project on time. To solve the problem, planning a proper project timeline and setting a milestone is a must so that the project can run smoothly and can be completed on time.

4.3 Timeline

Project timeline act as an important role for created a project. Project timelines used to know what milestones need to be achieved and amount of time need to spend on each step. Establishing a timeline to help to keep on track of project progress and make sure to spend adequate amounts of time on each step. In addition, project timeline will help to assess how time delays will impact the project. During development process uncertainty might happened, must have some specific action to solve the problem to ensure that the project able to successful develop. This sections show the timeline of the project, wish that project can be successful develop according to the plan.

4.3.1 Project Timelines for Project One

There are total 14 available weeks to complete the project one which includes the first four chapters of the project thesis. Gantt chart below show the timeline to use for project one start from define project introduction to project one presentation.

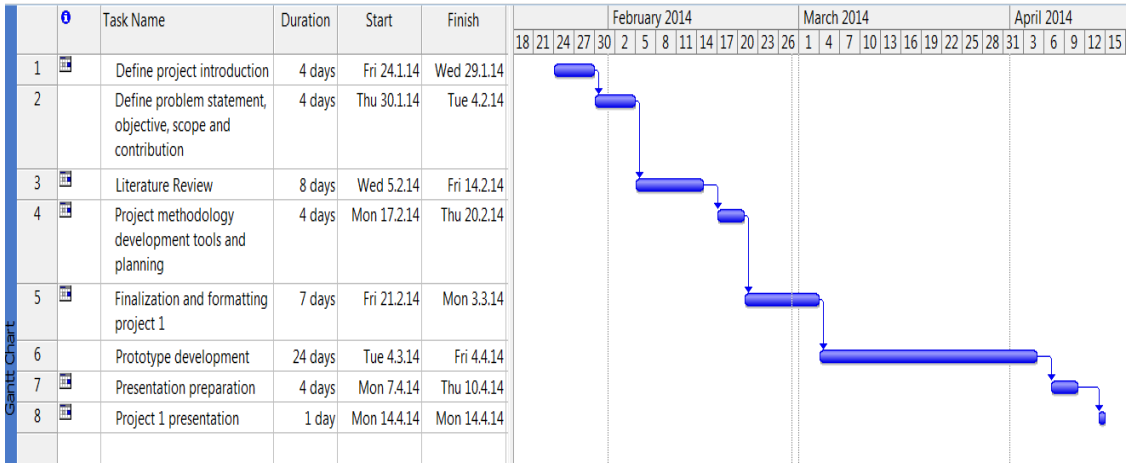


Figure 4.2 Gantt Chart for Final Year Project I

4.3.2 Project Timelines for Project Two

There are total 14 available weeks to complete the full project thesis. Gantt chart below show the timeline to use for project two start from familiar with development methods and tools and ends with Final Year Project presentation.

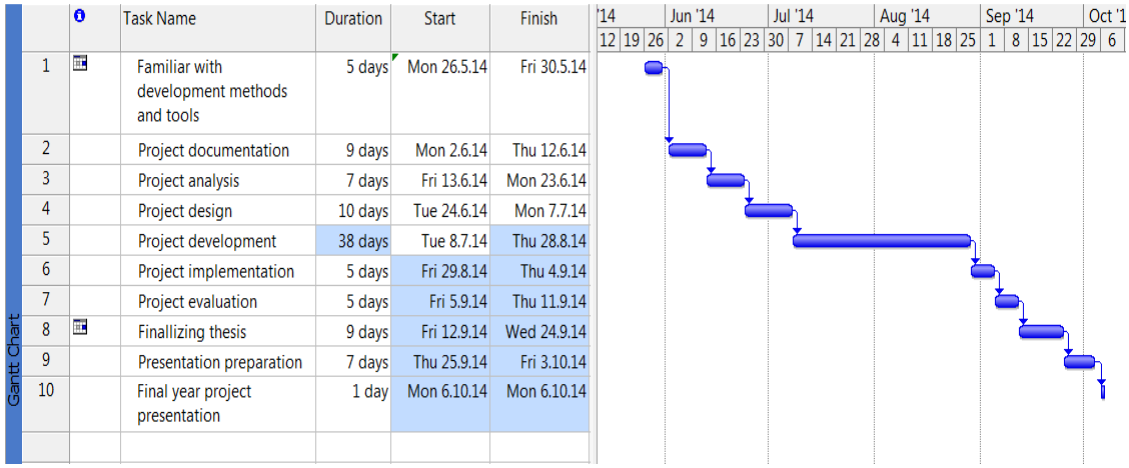


Figure 4.3 Gantt Chart for Final Year Project II

4.4 Requirement Specifications

4.4.1 User Requirement

Table 4.1 Software Required by User

Category	**Software requirement**
Operating System	Windows XP, Vista, Windows 7

4.4.2 Development Tools

Hardware and software is a basis specification for a system development. The system could not be developing if without either one of the specification.

- Hardware

Computer or laptops is needed to develop the project with any Windows Operating System. A standard computer specification will be able to do the development process.

Table 4.2 Computer Hardware Specifications.

Processor	Intel® Core™ 2 Duo CPU
Operating System	Windows 7 Ultimate
Memory	4GB
Graphics	Intel® Graphics Media Accelerator 45000HD (integrated)
Wireless Modem Router	Innacomm W3100
Hard Disc Storage	250GB

- Software

To fulfil the system development, software is needed in the development.

Table 4.3 Software Specification

Category	**Software**	**Functionality**
Development tools	Macromedia Flash 8, ActionScript 3.0	Interface with animation, code editor for Adobe Flash Player 9
Operating System	Windows 7	Computer Platform

4.4.3 Design and Verification Plan

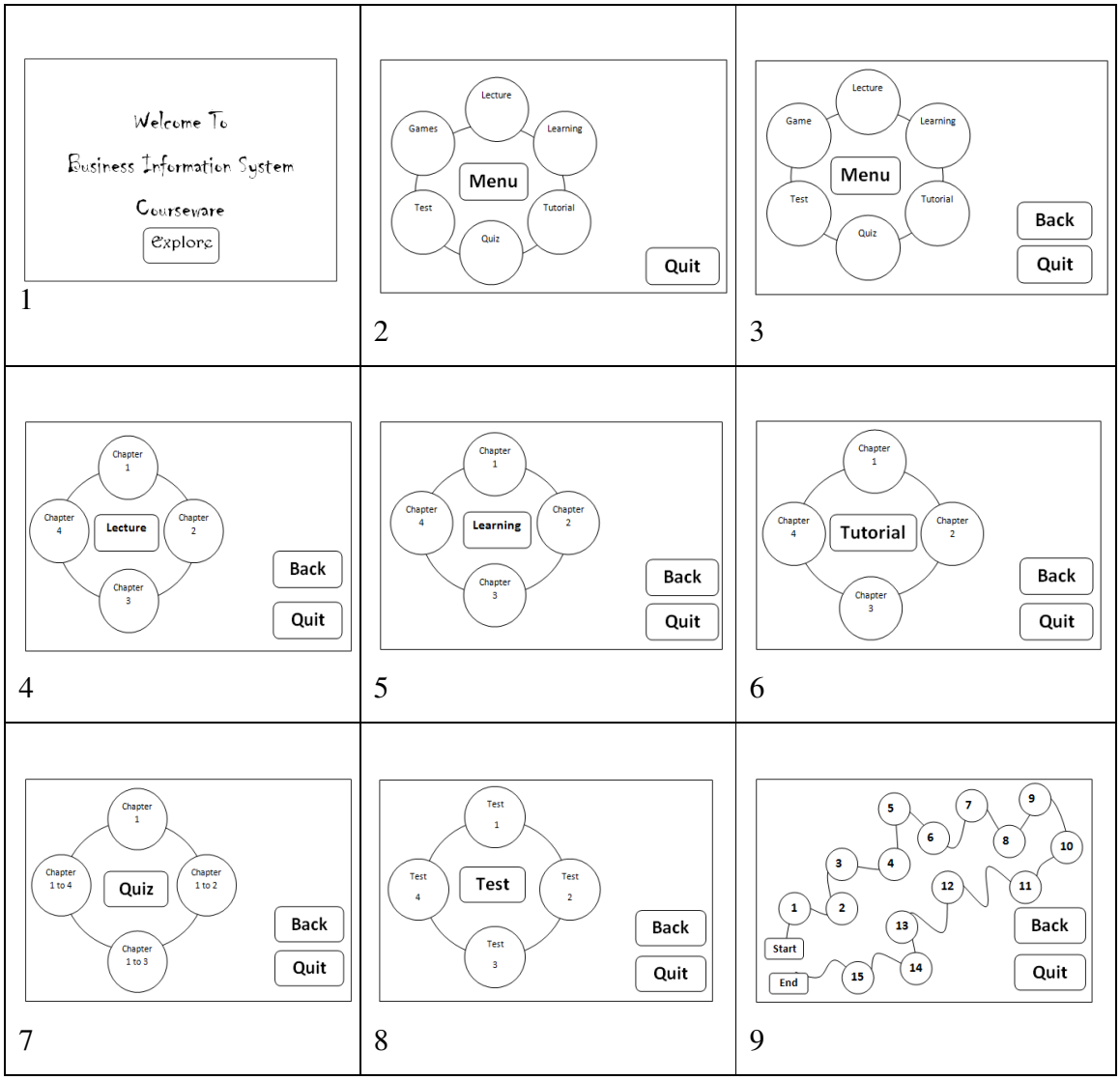
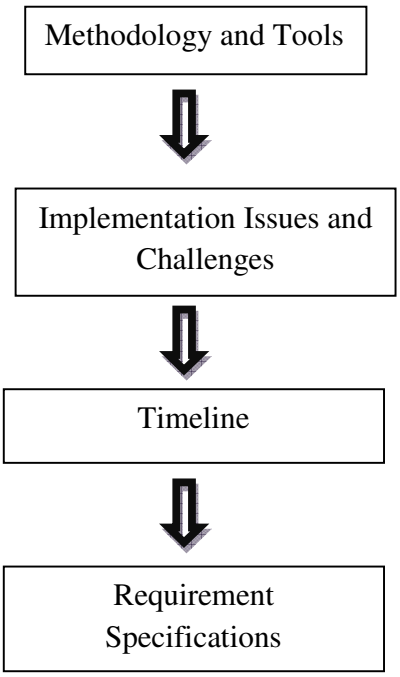


Figure 4.4 Design Storyboard


Methodology and Tools
Implementation Issues and Challenges
Timeline
Requirement Specifications

CHAPTER FIVE

INTRODUCTION

This chapter presents brief overview of the system implementation. This followed by the research software installation and courseware installation. Finally, this chapter concludes with a brief outline of this thesis.

5.1 Implementation

This chapter will state a clear view of courseware implementation phase which starts from software installation. The courseware implementation phase proceeds base on the user requirement, hardware requirement and software requirement which stated in chapter 3.

5.2 Software Installation

Numerous of softwares can be installed before proceed to the courseware installation.

5.2.1 Software that can decode .swf files

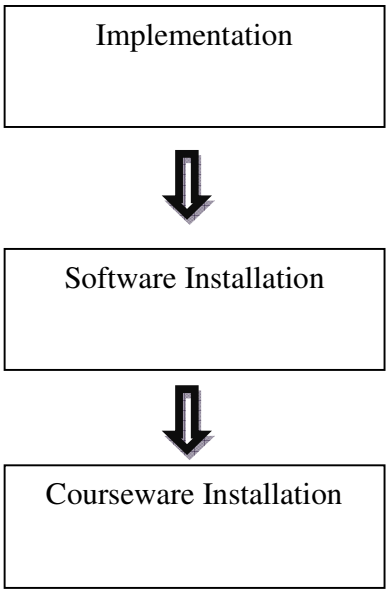
- Adobe Flash Player and Macromedia Flash. Adobe Flash Player is available on https://www.adobe.com/support/flashplayer/downloads.html

5.2.2 VMware Player

- VMware Player is a virtualization software to run IBM Cognos 10.
- VMware Player will be distributed together with the courseware.
- Users can install the VMware Player by following the step by step guide in the courseware.

5.3 Courseware Installation

For the courseware installation, it is relatively simple and easy. After installation of the flash player, just need to have a copy of the courseware flash movie file (.swf) double click it then can start to enjoy using the courseware. One of the advantages of using courseware developed by flash is users only have to click on the movie file and play it. Unlike other system, need to spend time on the troublesome installation process.


Implementation
Software Installation
Courseware Installation

CHAPTER SIX

INTRODUCTION

This chapter presents brief overview of the system testing. This followed by the research courseware testing, project impact and contribution, the Sample Feedback Form for Business Intelligence System Courseware and feedback analysis. Finally, this chapter concludes with a brief outline of this thesis.

6.1 Courseware Testing

Courseware testing is the last phase of the courseware development. In the phase of courseware testing, numerous of testing is carry out to ensure the courseware is able to run smoothly without bugs and errors; technical or logical error.

6.1.1 Achievement Results after Testing:

Table 6.1: Courseware Module Achievement Results

Courseware Module	**Success**
Learning Module	Yes
-video	N/A
-graphic	Yes
-animation	Yes
-audio	Yes
-interactive button	Yes
Lecture Module	Yes
-video	Yes
-graphic	N/A
-animation	No
-audio	Yes
-interactive button	Yes

Quiz Module	No
Tutorial Module -video -graphic -animation -audio -interactive button	Yes N/A No No No Yes
Test Module	No
Game Module	No

Table 6.2: Courseware Functionality Testing Results

Courseware Functionality	**Success**
Audio	Yes
Graphic	Yes
Animation	Yes
Video	Yes
Button (Link)	Yes
Button (Effect)	Yes

6.2 Project Impact and Contribution

After the project is completed, the courseware is decided to be released for other UTAR students who are not taking the subject UCCB3104 Business Intelligence Information System but are intended to learn Business Intelligence.

By releasing the courseware to other students, feedback is collected by them. Due to lack of time, feedback is collected after they used the courseware for 3 continuous days.

6.3 Sample Feedback Form for Business Intelligence System Courseware

Feedback Form for Business Intelligence System Courseware

Gender: Male ☐ Female ☐

Faculty: Course:

1. Have you use a courseware before?
   Yes ☐ No ☐

2. Do you find the courseware useful to you?
   Yes ☐ No ☐

3. Do you understand what Business Intelligence is after using the courseware?
   Yes ☐ No ☐

4. Will the courseware get your attraction once you play it?
   Yes ☐ No ☐

5. Is the audio clear enough to be heard?
   Yes ☐ No ☐

6. Do you find the videos in the courseware helpful to you?
   Yes ☐ No ☐

7. Do you find the colour used in the courseware is suitable?

   Yes ☐ No ☐

8. Is the courseware easy to use?

   Yes ☐ No ☐

9. Will you continue using the courseware?

   Yes ☐ No ☐

6.4 Feedback Analysis

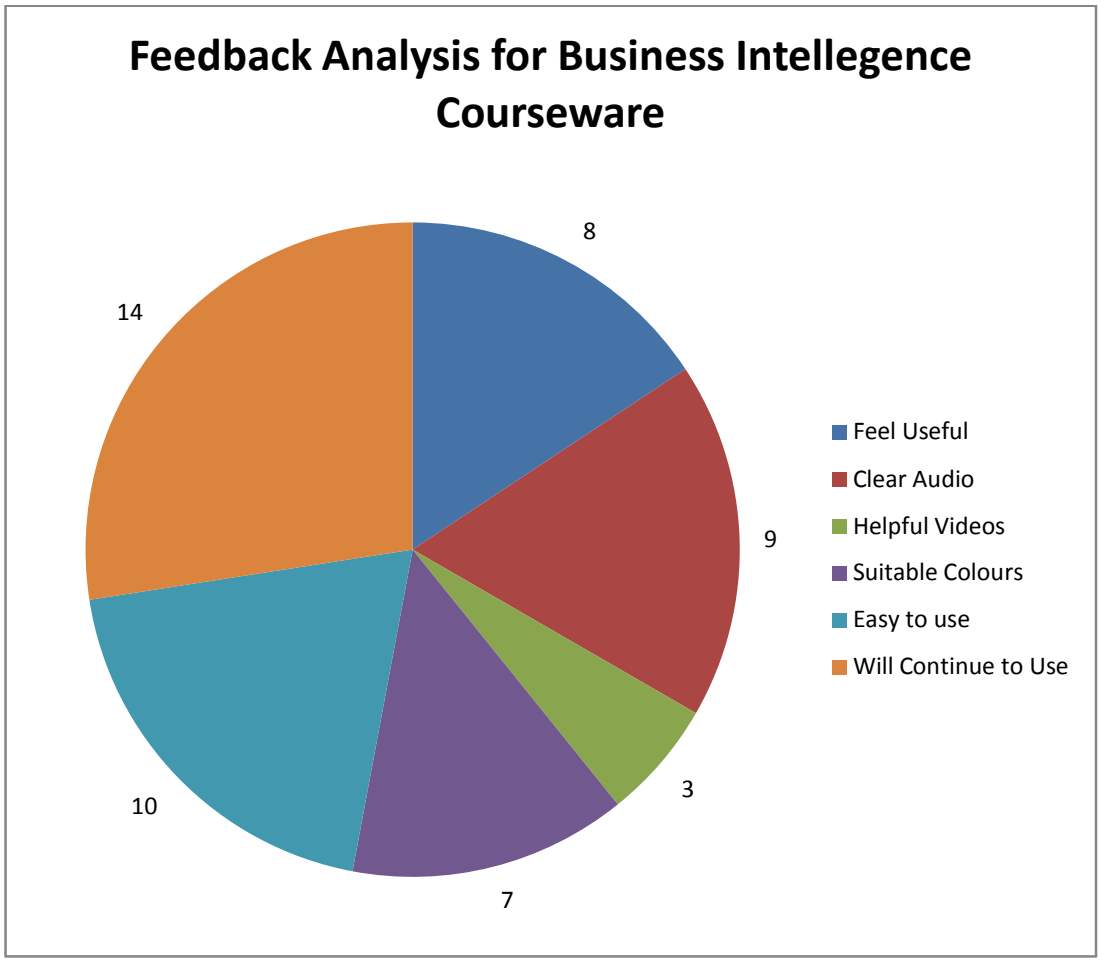
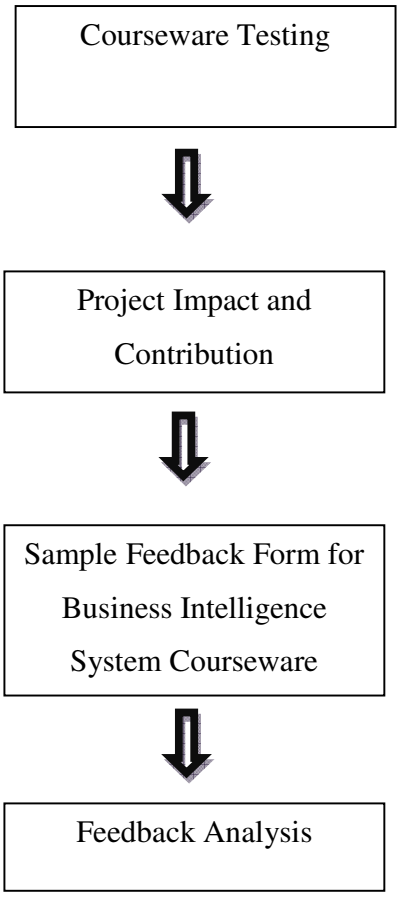


Figure 6.1 Pie Chart for Feedback Analysis

The courseware is distributed to a survey group of 15 students who are not taking the subject UCCB3104 Business Intelligence Information System. Feedback is collected after 3 days continuously used of the courseware.

From the figure above, 8 students from the survey group feel that the courseware is useful to them. 9 out of 15 students agreed that the courseware possesed clear audio. However, only 3 students from the group feel that the videos in the courseware are helpful. Half of the survey group feel that the used of color for the courseware is suitable. Besides, 10 out of 15 students feel that the courseware is easy to use. Finally, 14 out of 15 students will continue to use the courseware which is a very high number as only 1 student from the survey group do not want to continue to use the courseware. In conclusion, the results from the feedback is very satisfied as most of the comments for the courseware are positive.


Courseware Testing
Project Impact and Contribution
Sample Feedback Form for Business Intelligence System Courseware
Feedback Analysis

CHAPTER SEVEN

INTRODUCTION

This chapter presents the final conclusion of the research. This followed by the project review, contribution of the project and future work. Finally, this chapter concludes with a brief outline of this thesis.

7.1 Conclusion

7.1.1 Project Review

The main aim of the project is to develop a multimedia courseware for UTAR students who take the subject UCCB3104 Business Intelligence Information System to learn effectively. As Business Intelligence is a theory-based subject, students tend to be less interested in.

Business Intelligence contains practical session, students might be difficult to catch up while attending practical class as time is limited and the facilities like computers in the lab is relatively slow. With the help of the courseware, workload of lecturers will be reduced.

During the project, many researches are done such as benchmarking existing courseware with others. Besides, Macromedia Flash software is learnt by referring text books and website and action script is also learnt. So, much knowledge has been gain throughout the project.

7.1.2 Discussions

In the project an interactive multimedia courseware for UTAR students to learn Business Intelligence has been developed. However, the courseware is not completed due to lack of time.

The courseware includes video, audio, graphics and animations. This is increase the attraction of the courseware but the sound used in the courseware is translated using software so the tone of the sound is less attractive.

The functionality and module in different courseware and benchmark with the proposed courseware has been studied during the analysis process in the project. This is to understand the existing courseware. Study and analyze the functionalities among different courseware to support the proposed courseware. A courseware with better design has been proposed but has not been completed due to lack of and time as there are too many modules in the courseware.

A suitable interface and functionalities is developed. Everything has been considered carefully from the use of colors, arrangement of buttons and audios imported. This is very important as users will be attracted once they see the interface of the courseware.

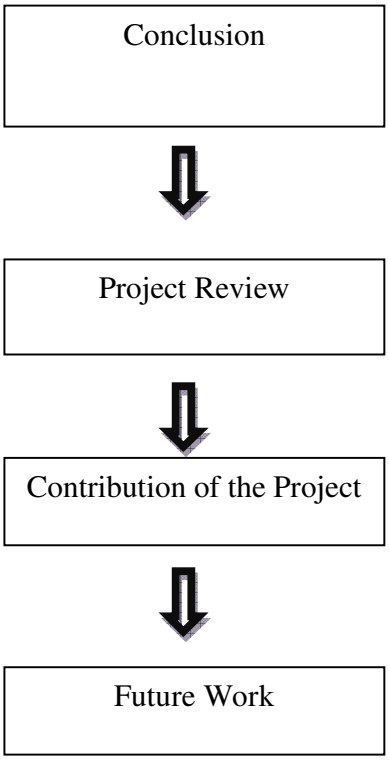
7.2 Contributions of the Project

By using the courseware, students will have more interest in study as it is fun compare to traditional study method. Thus, students can study effectively and results in better grades in their final exam. Besides, students can study the topics that not yet been teach and also revise the topics after study.

By using the courseware, students can also take the quizzes anytime when they are free and also play game while improving their understanding of the subject in the same time as the courseware has a game feature in it. Thus, students can use their free time in a more useful way instead of playing other online games.

7.3 Future Work

Due to the courseware has not been completed as promised. So, the courseware will be developed by continuing the rest of the modules stated in project scope in Chapter One. In the future, to improve the courseware, voice recognition will be implemented to take users speech input so that they can control the courseware by voice. The courseware can also be upgraded by implement intelligence in it. For an example, the courseware can analyse the users' weaknesses in which particular chapter so they can do quizzes more based on that particular chapter. This will help in improving the courseware in the future.


Conclusion
Project Review
Contribution of the Project
Future Work

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APPENDICES