BASIC POWER SYSTEM SMART LEARNING

Nor Atikah bt Mohamad Rosli

BEKP

2009

"I hereby declare that I have read through this report entitle Basic Power System Smart Learning and found that it has comply the partial fulfillment for awarding the degree of Bachelor of Electrical Engineering (Industrial Power)"

Signature : ....

Supervisor's Name : Pn. Jurifa bt Mat Lazi

Date : 13th of May 2009

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NOR ATIKAH BT MOHAMAD ROSLI

A report submitted in partial fulfillment of the requirements for the degree of Electrical Engineering

Faculty of Electrical Engineering

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

May 2009

I declare that this report entitle Basic Power System Smart Learning is the result of my own research except as cited in the references. The report has not been accepted for any degree and is not concurrently submitted in candidature of any other degree

Signature   :   ....

Name   :   Nor Atikah bt Mohamad Rosli

Date   :   13th of May, 2009

To my beloved mama and abah,

Pn. Faridah bt. Ghazali and En. Mohamad Rosli b. Ismail

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ABSTRACT

Basic Power System smart Learning is a Final Year Project (FYP) that using an e-Learning approach. The e-Learning lesson will be on Basic Power System subject taken by year two student Faculty of Electrical Engineering (FKE) Universiti Teknikal Malaysia Melaka (UTeM). In order to develop this e-Learning project, two chapters are involved which are Transmission Line chapter and System Protection chapter. Each chapter has several subtopics to be discussed. Since this e-Learning project is developed to guide students in Faculty of Electrical Engineering (FKE), Universiti Teknikal Malaysia Melaka (UTeM) especially year two students through information in an easy way, the scope is undertaken based on the Basic Power System subject syllabus. For Transmission Line chapter, the subtopics discussed are Introduction, ABCD Matrix, Short Line Model, and Medium Line Model. Whereas, the subtopics in System Protection chapter include Introduction, Protection System Components, Primary and Back up Protection, and Zones of Protection. In order to successfully complete this project, Basic Power System Smart Learning is developed by using Macromedia Flash 8 software.

ABSTRAK

Basic Power System Smart Learning merupakan sebuah Projek Sarjana Muda (PSM) yang menggunakan pendekatan e-Learning. Pembelajaran e-Learning ini adalah tentang subjek Asas Sistem Kuasa yang diambil oleh pelajar tahun dua Fakulti Kejuruteraan Elektrik (FKE), Universiti Teknikal Malaysia Melaka (UTeM). Bagi menjayakan projek e-Learning ini, dua bab akan dibincangkan iaitu bab Talian Penghantaran dan bab Sistem Perlindungan. Setiap satu daripada bab ini mengandungi beberapa tajuk kecil yang akan dibincangkan. Oleh kerana projek e-Learning ini dibuat untuk membantu pelajar Fakulti Kejuruteraan Elektrik (FKE), Universiti Teknikal Malaysia Melaka (UTeM) terutama pelajar tahun dua untuk belajar Asas Sistem Kuasa secara mudah, skop pengajaran diambil berdasarkan sukatan pembelajaran subjek ini. Bagi bab Talian Penghantaran, tajuk kecil yang akan dibincang termasuklah Pangenalan, Matrik ABCD, Model Talian Pendek, dan Model Talian Sederahana. Manakala, untuk bab Sistem Perlindungan pula, tajuk kecil yang akan dibincangkan adalah Pengenalan, Komponen Sistem Perlindungan, Perlindungn Utama dan Sokongan, dan Zon Perlindungan. Bagi menjayakan projek ini, Basic Power System Smart Learning adalah menggunakan software Macromedia Flash 8.

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CHAPTER 1

INTRODUCTION

1.1   Project Background

Basic Power System Smart Learning is a project that used an e-Learning approach. E-learning or also known as Electronic Learning is a type of technology supported education or learning where the medium of instruction is through computer technology. E-Learning can also defined as a network or online that takes place in a formal context and uses a range of multimedia technologies. The learning process can be carried out either individually or on small or large group basis. Since this learning process is using computer technology, for some instances there is no face-to-face interaction takes place for example it is exclusively used in open and distance learning (ODL). However, it also can be used in conjunction with face to face teaching. As such, e-Learning is not confined to the boundaries of the online format but also includes the offline format using any form of electronic media to facilitate the teaching and learning process. Users have the ability to work on the course at any time and from anywhere as long as there is a computer, internet access and a board email account if needed. E-Learning furnishes user with the self-paced modules, knowledge of the internet and computer skills, an opportunity to become independent and self reliant, flexibility of time-tabling and scheduling.

The importance of e-Learning can be seen through the interactive technology that offers a new mode of engagement with ideas via both material and social interactivity online. E-Learning offers the ability to manage quality at scale, and share resources across networks, its greater flexibility of provision in time and place makes it good for widening participation. And also reduction in social difference

afforded by online networking fits with the idea that students should take greater responsibility for their own learning.

The Basic Power System Smart Learning is an e-Learning lesson on Basic Power System subject. Two chapters are involved which is Transmission Line and System Protection. The aim is to make the study about Basic Power System subject interesting, simple and easy. The project is designed to guide students in Faculty of Electrical Engineering (FKE), Universiti Teknikal Malaysia Melaka (UTeM) especially year two students through information in an easy way with animations to make it easy to be understood. Hence, this project is profitable and helpful in education process since it can increase consistency among student when learning is captured and delivered by technology.

1.2   Problem Statements

Problem statement is a clear concise description of the issues that faced during developing this project. The problem statement needs to be addressed by problem solving so that a good result can be achieved.

Currently e-Learning has not rapidly advanced in nowadays technology. Most of students are not exposed to this kind of learning process caused less understand to the environment. As such, students are not comfortable with e-Learning method, as they are more familiar with the traditional learning process. Since the implementation of e-learning system by any institution or this institution not extensive, the exposure to students about this learning environment is limited. Owing to as such, students cannot fully understand the benefit of the e-Learning education system. Indeed, this project might help to solve this problem by exposing to students an interactive e-Learning on Basic Power System subject.

The existences of e-Learning system in the market nowadays are mostly focus on children education whereas the exposure to e-Learning course among the high education is in smaller amount. This may due to lack of support from the top management since in order to successfully develop an online learning in higher

education needs a total commitment and support from top management. Besides, the participation, cooperation and support from major universities are needed to expose the e-Learning to higher education. The Ministry of Education needs to have guidelines to help schools and higher learning institutions to implement e-Learning successfully and efficiently.

The manual learning process which is in class learning is less encourages most of students in understanding the subject of Basic Power System (Transmission Line and System Protection). Most of them have difficulties to clearly understand about this topic. Concern to this problem, Basic Power System Smart Learning is constructed to make the study about Basic Power System (Transmission Line and System Protection) simple and easy besides to convince the students to use this kind of learning system.

1.3   Project Objective

In order to make sure this project perfectly accomplished, this project was developed based on several objectives. The objectives of this project are as below:

1. To develop an e-learning courseware on Basic Power System subject (Transmission Line and System Protection).
2. To study and explain the Basic Power System Subject in creative way.
3. To expose an interactive way in study on Basic Power System (Transmission Line and System Protection) to electrical student.

1.4   Project Scope

This Basic Power System Smart Learning project scope is divided into two main topics. Each topic has several subtopics to be discussed. The scope is undertaken based on the Basic Power System subject syllabus. Table 1.1 shows the topics and subtopics for each topic.

Table 1.1: Project scope

No.	Topic	Sub Topic	
1.	Transmission line	i.	Introduction to Transmission Line
		ii.	ABCD Matrix
		iii.	Short Line Model
		iv.	Medium Line Model
2.	System Protection	i.	Introduction to System Protection
		ii.	Protection System Components
		iii.	Primary and Back Up Protection
		iv.	Zones of Protection

CHAPTER 2

LITERATURE REVIEW

2.1   Introduction

A literature review is a body of text that aims to review the critical points of current knowledge on a particular topic. A literature review can be just a simple summary of the sources, but it usually has an organizational pattern and combines both summary and synthesis. A summary is a recap of the important information of the source, but a synthesis is a re-organization, or a reshuffling, of that information. It might give a new interpretation of old material or combine new with old interpretations. It also might trace the intellectual progression of the field, including major debates.

The literature review ultimate goal is to bring the reader up to date with current literature on a topic and forms the basis for another goal, such as the justification for future research in the area. In this chapter, all the procedure of web-based system will be explained. This includes the domain that related to this web-based system, the current system that exists and the result after some research and comparison.

2.2   Domain

Electronic Learning (E-Learning) is a method that used animations to deliver information and knowledge to the users and the domain is Macromedia Flash Software. Macromedia Flash Software is a set of multimedia software created by

Macromedia and currently developed and distributed by Adobe Systems. Since its introduction in 1996, Flash has become a popular method for adding animation and interactivity to web pages. Flash is commonly used to create animation, advertisements, and various web page components, to integrate video into web pages, and more recently, to develop rich internet applications. Flash can manipulate vector and raster graphics and supports bi-directional streaming of audio and video. It contains a scripting language called Action Script. Several software products, systems, and devices are able to create or display Flash content, including Adobe Flash Player, which is available for most common web browsers, some mobile phones and other electronic devices (using Flash Lite). The Adobe Flash Professional multimedia authoring program is used to create content for the Adobe Engagement Platform, such as web applications, games and movies, and content for mobile phones and other embedded devices.

This software will make the learning through e-learning interactive and attractive by sound effects (musical), audio instructions (linguistic), simple example with animation and also the tutorial about the topic.

2.3   Existing System

The research on existing system or examples which related to this project is a must. It should be a good guideline or references as the case study on the existing system will be constructed in finding the advantages and disadvantages in order to accomplished this project successfully.

i)   Example 1: e-Learning on 'Symmetrical Components'

This is an example of e-Learning lesson on Symmetrical Components topic developed by Professor David C. Yu from University of Wisconsin [6]. Figure 2.1 shows the front page of this e-Learning example. This e-learning provides sufficient notes and lots of formulas related to Symmetrical Components topic. Besides, it also includes some examples in order to make sure the user can easily understand the topic discussed. However, user might get bored when using this kind of e-Learning

because it has lack of animation. Apart from that, the user interface was less attractive. Overall, this Symmetrical Component e-Learning example is interactive but not so attractive.
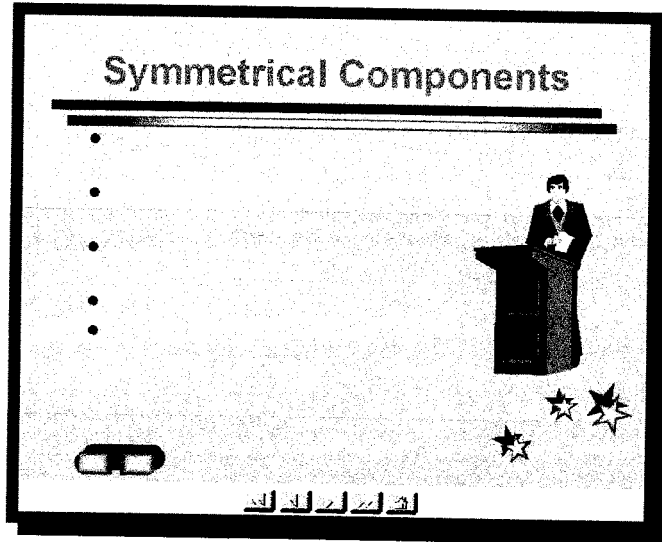

Figure 2.1: Symmetrical Components e-Learning front page

ii)   Example 2: e-Learning on 'Sistem Tiga Fasa'

This is a quite good e-Learning example. It is about 'Sistem Tiga Fasa' developed by Prof Dr Marizan Sulaiman, Zainuddin Mat Isa and Mrs Azrita Alias from Universiti Teknikal Malaysia, Melaka (UTeM) [7]. Figure 2.2 shows one of its learning content. This example of e-learning explained about the 'Sistem Tiga Fasa' topic by using the approach of drawing diagram, colourful word and also includes the calculation for impedances where the user can easily key in any value to simulate the result. Furthermore, this e-Learning also provides some animation for user understanding. After going through this page, user can simply understand and gain knowledge. However, this e-Learning provides no example. Overall, this 'Sistem Tiga Fasa' e-Learning example is interactive and attractive.
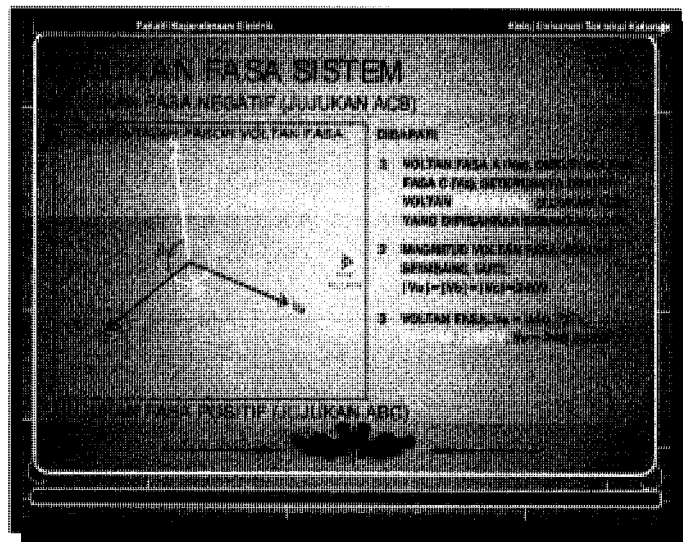
Figure 2.2: 'Sistem Tiga Fasa' e-Learning content

2.3.1 Comparison of Existing System

Both of the two e-Learning lesson examples are attractive. The e-Learning lesson example on Symmetrical Components topic developed by Professor David C. Yu from University of Wisconsin as in Figure 2.1 seems to be attractive because it is using a suitable background colour with beautiful graphics design. Whereas, the e-Learning lesson example on 'Sistem Tiga Fasa' developed by Prof Dr Marizan Sulaiman, Zainuddin Mat Isa and Mrs Azrita Alias from Universiti Teknikal Malaysia, Melaka (UTeM) as in Figure 2.2 seems to be attractive because it is using a simple background with the colourful words that might help learning process.

The e-Learning lesson example on Symmetrical Components is less interactive compare to the e-Learning lesson example on 'Sistem Tiga Fasa'. The e-Learning on 'Sistem Tiga Fasa' is easier to deal with compare to the e-Learning on Symmetrical Components because it is using simple and easy words and provides a lot of animations. However, the e-Learning lesson example on Symmetrical Components provides a lot of examples for the users while the e-Learning on 'Sistem Tiga Fasa' has no example at all. The comparison between the two e-Learning examples is shown in Table 2.1.

Table 2.1: Comparison of existing system

	E-learning on 'Symmetrical Components'	E-learning on 'Sistem Tiga Fasa'
Attractive	Good	Good
Interface	Good	Good
Interactive	Average	Good
Easy to Deal with	Average	Good
Simple and Easy Word	Average	Good
Animation	Average	Good
Clearly Marked Exits	Good	Good
Shortcuts	Average	Average
Example	Good	Average

2.4 Outline of e-Learning Module

To develop this project courseware, a clear understanding on the e-Learning module is a must. Research and study are made on Macromedia Flash software. At the same time, study also made on the Transmission Line and System Protection subtopics based on the Basic Power System syllabus.

2.4.1 Macromedia Flash 8 Software

Macromedia Flash provides everything that needed to create and deliver rich web content, presentations, powerful applications and other content that enables user interaction. Through this software, the motion graphics or building data-driven applications can be designed. Macromedia Flash has the tools to produce great results and deliver the best user experience across multiple platforms and devices. Flash projects can include simple animations, video content, complex presentations, applications, and everything in between.