



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

**SMART PLC: DEVELOPMENT OF AN ELECTRONIC
EDUCATIONAL QUIZ KIT TO TEST STUDENT
KNOWLEDGE ON CONVERTING OF TIMING
DIAGRAM TO LADDER DIAGRAM**

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Electronic Engineering Technology (Telecommunication) with Honours.

by

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Knowledge on Converting of Timing Diagram to Ladder Diagram

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I hereby, declared this report entitled Smart PLC: Development of an Electronic Educational Quiz Kit to Test Student Knowledge on Converting of Timing Diagram to Ladder Diagrams the results of my own research except as cited in references.

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APPROVAL

This report is submitted to the Faculty of Electric and Electronic Engineering Technology of Universiti Teknikal Malaysia Melaka (UTeM) as a partial fulfilment of the requirements for the degree of Bachelor of Electronic Engineering Technology (Telecommunications) with Honours. The member of the supervisory is as follow:

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ABSTRAK

Pengawal Logik yang Boleh Diprogramkan adalah salah satu mata pelajaran wajib yang dipelajari dalam Teknologi Kejuruteraan Elektrik. Salah satu tajuk dalam Pengawal Logic ialah berkaitan dengan menukar Rajah Masa ke Rajah Tangga.

Berdasarkan tinjauan, kebanyakan pelajar mendapati topik ini sukar difahami. Terdapat berdasarkan masa yang disediakan untuk melengkapkan eksperimen di makmal. Tidak juga berdasarkan makmal, terdapat juga berdasarkan kelas dan sesi tutorial. Seperti dalam makmal, pelajar perlu melakukan percubaan mereka dengan diri mereka sendiri. Para pelajar kadang-kadang tidak memahami prosedur di makmal. Oleh itu, mereka terus meminta pensyarah atau bimbingan untuk membantu mereka. Para pelajar juga tidak begitu memahami topik gambarajah tangga dan mereka juga memerlukan tangan ke atas kemahiran terutama di makmal.

Projek ini cuba menangani masalah dengan memperkenalkan kit kuiz elektronik dengan aplikasi android yang memberitahu pengetahuan pelajar mengenai topik yang disebutkan. Menggunakan kit pendidikan ini, para pelajar akan membaca soalan gambarajah masa di app Android dan memasangnya dengan gambarajah tangga yang sepadan pada kit pendidikan. Untuk mengukur keberkesanan kit pendidikan ini, tinjauan yang terdiri daripada 19 soalan dilakukan kepada 53 responden pelajar Fakulti Teknologi Kejuruteraan Elektrik dan Elektronik, FTKEE dan Fakulti Teknologi Kejuruteraan Mekanikal dan Pembuatan, FTKMP, UTeM. Hasilnya menunjukkan bahawa kit pendidikan adalah menarik, mudah digunakan dan melengkapkan pembelajaran dan pengajaran.

ABSTRACT

Programmable Logic Controller is one of the compulsory subject that learned in the Electrical Engineering Technology. One of the topic in Programmable Logic Controller is related to converting the Timing Diagram to the Ladder Diagram.

Based on the survey, most of the students find that this topic is difficult to understand. There are based on the time that are provided to completing the experiments in the lab. Not also based on the lab, there are also based on the class and the tutorial sessions. As in the lab, students needed to do their experiment by their self. The students were sometimes does not understand the procedure in the lab. Due to that, they keep on asking the lecturers or the guidance to help them. The students also does not quite understand on the ladder diagram topic and they also required the hands on skills especially on the lab.

The project attempts to address the problem by introducing an electronic quiz kit with Android application that tell the students' knowledge on the mentioned topic. Using this educational kit, the students will read the timing diagram questions at the android app and assemble it with the corresponding ladder diagram on the educational kit. In order to measure the effectiveness of this educational kit, the survey consist of 19 questions is done to 53 respondent of Fakulti Teknologi Kejuruteraan Elektrik dan Elektronik, FTKEE and Fakulti Teknologi Kejuruteraan Mekanikal dan Pembuatan, FTKMP, UTeM students. The results shows that the educational kit is interesting, easy to used and complement the learning and teaching lessons.

DEDICATION

This paper is dedicated to my beloved parents, my respectful supervisor my love one, my lecturers and also my friends.

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LIST OF SYMBOLS

cm	-	Centimetre
°C	-	Celsius
D, d	-	Diameter
F	-	Force
g	-	Gram
m	-	Meter
R	-	Resistance
V	-	Voltage
3D	-	3 Dimension
Ω	-	Ohm
%	-	Percentage

LIST OF ABBREVIATIONS

AF	-	And-Forward
AMI	-	Advance Metering Infrastructure
AMR	-	Adaptive Multi-Rate
Apps	-	Application
LCD	-	Liquid Crystal Display
Lab	-	Laboratory
LDMicro	-	Ladder Logic for PIC and AVR
FPWIN	-	Panasonic Software for PLC
FYP	-	Final Year Project
GHz	-	Giga Hertz
HPWC	-	High Power Wall Charger
HSRC	-	Half PLC/remote Single –Transfer Channel
I/O	-	Input Output
IoT	-	Internet of Things
JSON	-	JavaScript Object Notation
LAN	-	Local Area Network
LCD	-	Liquid Crystal Display
LD	-	Ladder Diagram
LED	-	Light Emitting Diode
LTE	-	Long Term Evolution
LV	-	Low voltage
MCGS	-	Machine Checking Gauge software
NFC	-	Near Field Communication
OA	-	Ideal Power Assignment
PC	-	Personal Computer
PLC	-	Programmable Logic Circuit
RF	-	Radio Frequency
SC	-	Choice Consolidating

SG	-	Smart Grid
SGML	-	Standard Generalized Markup Language
SRC	-	Single-Hand-Off channel
TFT	-	Thin Film Transistor
USA	-	United States of America
UTeM	-	Universiti Teknikal Malaysia Melaka
VAC	-	Voltage Alternating Current
VDC	-	Voltage Direct Current
WIFI	-	Wireless Fidelity
XML	-	Extensible Markup Language

CHAPTER 1

INTRODUCTION

1.1 Introduction

This section will clarify the review of the investigation and the motivation behind this project. The part incorporates the background of study, problem statement, objectives of the project that is relied upon to be accomplished, and scope of the work that will be led, and then will be followed by the project contribution.

1.2 Background of Study

Educational kit is a tools that were used in order to make the teaching and learning more exciting and interesting. By using the educational kit, it will help the students to understand the link between the practical work and the theory. Based on Ashaari (1999), educational kit is defined as the tools that used in the teaching which is should not be limited to the devices that are commonly used as a blackboard, pictures and all of the hardware and the software for teaching. Nowadays, can said that the educational kit is raising from time to time. All of people tried to make the students life specifically being easier with the used of the educational kit. There are a lot of importance of the educational kit. Compared to the actual trainer, the cost of the educational kit is usually cheaper. The educational kit also a lot smaller and lightweight compared to the actual trainer.

The programmable logic controller (PLC) has been taught in Universiti Teknikal Malaysia Melaka (UTeM) as in the subject that must be taken in order to grad