UNIVERSITI TEKNIKAL MALAYSIA MELAKA

DEVELOPMENT OF AN ELECTRONIC EDUCATIONAL QUIZ BOARD THAT TEST STUDENT KNOWLEDGE ON LAPLACE TRANSFORM

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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Tajuk: development of an electronic educational quiz board that test student knowledge on laplace transform

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This report is submitted to the Faculty of Electrical 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 (Telecommunication) with Honours. The member of the supervisory is as follow:

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ABSTRAK

Laplace Transform adalah wajib untuk pelajar elektrik, elektronik dan mekanikal untuk belajar. Oleh itu, Looping Board diwujudkan untuk membantu pelajar meningkatkan pengetahuan mereka dalam Laplace Transform. Dengan ini, pelajar dapat mempelajari subjek ini tanpa pensyarah. Objektif projek ini adalah untuk membina papan kuiz pendidikan yang berkesan, mudah dibawa dan mesra digunakan dengan menggunakan aplikasi MIT. Looping Board akan mengandungi soalan yang lebih kurang dengan peperiksaan akhir. Dengan kit pendidikan ini pelajar dapat menguji sendiri pengetahuan atau peningkatan pelajar tentang Laplace Transform bukan dalam teori tetapi juga praktikal. Seterusnya, untuk membina kit pendidikan yang mudah dibawa dan menarik untuk pelajar menggunakan Looping Board ini berbanding dengan konsep pembelajaran biasa. Akhir sekali, untuk mengesahkan fungsi kit pendidikan ini dengan menjalankan tinjauan yang terdiri daripada 10 soalan kaji selidik dan 50 responden.

ABSTRACT

Laplace Transform is compulsory for student electric, electronic and mechanical to learn. Therefore, Looping Board is created to help student improve their knowledge in the Laplace Transform. With this student can learn this subject by themselves. The objective for this project is to build a cost effective, portable and friendly used educational quiz board by using MIT Apps. Looping board will contain a question that familiar with final exam. With this educational kit student can test themselves the knowledge or improvement about Laplace transform not in theoretical but practical too. Next, to build the educational kit that easy to carry and interesting for students using this Looping board compare to the normal teaching concept. Lastly, to verify the functionality of educational kit by conducting a survey that consists of 10 survey question and 50 respondents.

DEDICATION

This report is specially dedicated to all those who have supported, encouraged, challenged and inspired me and specially to my family member and friends for all their guidance, love and attention which made it possible for me to make it up to this point. Finally, to my supportive supervisor and co-supervisor.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ABBREVIATIONS

LED	-	Light Emitting Diode
IDE	-	Integrated Development Environment
GUI	-	Graphical User Interface
MIT	-	Technology Institute of Massachusetts
GND	-	Ground
Tx	-	Transmitter
Rx	-	Receiver

CHAPTER 1

INTRODUCTION

1.0 Introduction

The purpose of this research is to create a structure of this project on how the project work from beginning until it finished. It consists the detail of the project requirement needs to build this project by using hardware and software. The background of this project might be explained in brief. This chapter will be covered on problem statement, objective, scope of work and project contribution.

1.1 Background Study

Ian Glover (2014) stated that the aim of the simulation is to prove and experiences in the real thing by apply the learning and knowledge in class. Besides that, educational quiz board also define as a system that used in teaching that act as a creation of the hands on for the student in their study session. As Ashaari (1999) stated the educational quiz board is another alternative that used by lecture to educate student. Based on Muhamad Sobri's (2000) statistics of effectiveness using teaching method education kit, he concludes that students need the other alternative teaching method to gain their knowledge and gain greater understanding using educational kit tools. The training that focuses on the relationship between ideas helps students sees more possibilities and opportunities, boosting their ability to judge and develop new practices according to Dewey (2013). This can be proved by the survey conducted at Universities in Malaysia that the educational quiz board can help students improve their knowledge skills and make

learning during the teaching session more interesting for students. The control system is that it is compulsory for students to take on time as graduates. Student of electrical and electronic engineering technology faculty takes this subject. There are a lot of topics to cover for this subtopic, but one of the subtopics in this topic which is a Laplace transform which is needed for this project. This topic has theory and practice for testing student knowledge.

1.2 Problem Statement

As known in University Teknikal Melaka Malaysia (UTeM), it's important for electric, electronic and mechanical engineering student to learn control system subject and need this subject to be pass before graduate. Based on Memes (2012) Control System is the hardest subject for engineering courses because it involves a lot of math. Plus, Kent Aldershof (2016) also stated that for Electrical Engineering Control System may be the toughest subject to be learn because without proper knowledge of control systems student cannot be an electrical engineer.

Next, student needs a lot of time to learn and understand the control system because it's so hard to understand in a short time and it contains a lot of mathematics equations. In addition, student lack-off hand-on experience and only focus on theory can't help student. According to Babadogan and Olkun (2016) one of the most important barrier to reform program was a shortage of learning activities that support hand-on learning and visible modelling to represent abstract concepts.

Most of university student will take some time to understand the control system and sometimes becomes hard for student to catch-up the lesson in the class and laboratory because it's different form classroom environment. Moreover, in theory class student

learn how to calculate it manually and when comes to laboratory student can't answer it because of the twisted question. Therefore, to provide student opportunity became active engage and conduct experiments involving abstract theoretical concepts by using educational quiz board product might be the best solution.

1.3 Objective

In order to achieve the main objective, there are several objectives as follows:

1. To build a cost effective, portable and friendly used educational kit for university students who take electronic course.
2. To help university students who take electronic course more understand about the Laplace transform by developed an interactive educational kit.
3. To verify the functionality of educational kit to the problem statement by conducting a survey that consists of 10 survey question and 50 respondents of UTeM FTKEE students.

1.4 Scope of Work

This project is a cost effective and friendly used mean that this quiz board is easy to conduct and interact with an affordable cost. In this project the components that involve are Arduino Mega, Bluetooth module, LED, female header and resistor. This kit is use simulation concept to test the effectiveness for the educational quiz boards. In addition, Arduino Mega has more port compare to Arduino Uno. By using Arduino Mega as microcontroller is easier to use compare to Raspberry Pi and the coding that use is the basic coding. In designing the educational quiz board, concerned on creating a portable and friendly used with a 200g weight and 20x15cm size of educational quiz board to

increase understanding and knowledge as the kit is design for beginner learner especially for the university students who learn control system which is Laplace transform. The cost for built this project is less than RM200 as the component easy to find.

Finally, in order to determine how effective these projects the survey will be constructing using Google form to analyse it whether this project is effective for students. In this survey will consists 10 questions and students can give feedback after used the educational quiz board.

1.5 Project Contribution

The main propose is to help the university student that study the control system subject by build a low cost and friendly used educational quiz board. As know the Laplace transform is the tough subtopic thus, to make student more interesting to study this subject the educational quiz board is built for this project. This educational quiz board is built based on the topic that will ask in final examination and it's familiar with theory but the concept of box that will attract student to participate in doing the simulator. The educational quiz board consists of several questions that similar in the final exam. With this it will help student to find answer and not waste time to find the correct answer. Besides that, student will not feel bored learn the Laplace transform in theory class.

Lastly, to verify the effectiveness of this educational quiz board, the survey will be done in order to analyse the useful of this project for student. Furthermore, this educational quiz board can motivate the students toward learning. To conclude, this project might be getting a positive feedback from the survey about this educational quiz board that can help students to pass the Laplace transform question.