PROCEEDINGS

4th International Conference on Technical and Vocational Education and Training (TVET)

Theme:
Technical and Vocational Education and Training for Sustainable Societies

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FOREWORD

Welcome for all respected scholars, researchers, post graduate studentsand especially Keynote Speakers to the 4 ICTVET. The theme of the conference focus on Technical and Vocational Education and Training for sustainable societies and consist of six subthemes. i.e Development of learning model on TVET, Workplace Learning and entrepreneurship, Innovationon applied engineering and information technology, Management and Leadership on TVET, Vocational and Technical Teaachers education, and Assessment and Evaluation on TVET.

Sustainable society shoul be followed by the improvement of various factors that have impacts to the quality of vocational and technical education and training, particularly to overcome the competitiveness of the world business. As we have already known the rapid change of technology as well as the change of demography, having a great effects to the life of peoples in this world, The competitiveness need a collaborativeness to survive the life of millions peoples who lost their jobs. Young peoples as aproductive generation have to be creative and innovative to face the competitiveness. So this prociding contents consist of various findings of research in the field of vocational and technical education as well as applied technology and mainly based on the subthemes of the conference.

Finally, we would like to thank a million for all participants of this conference and all parties who support the success of this conference. Hopefully the seminars and scientific work of this seminar can be a reference material for basic education and elementary school teacher education in Indonesia.

Padang, July 2, 2018

Tim Editor

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DESIGN OF SIMULATOR FOR REPLACEMENT OF TOOLS PRACTICE DIGITAL ENGINEERING IN THE VOCATIONAL SCHOOL

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ABSTRACT: Vocational School, is a school that is expected to produce graduates who have the expertise, skills and competence in their field, to be Able to Compete in the world of industry and business world. This can only be Achieved if vocational schools have adequate facilities and infrastructure, from some research results, it is found that most vocational schools do not yet have adequate facilities and infrastructure. Limitations of funds are the cause of the inability of vocational schools to provide practical means. Simulators can be used instead of existing practice equipment, using simulators, vocational schools with limited funds can improve competency Reviews their graduates.

Keywords, Vocational School, Competency, Simulator

I. INTRODUCTION

Indonesian National Qualifications Framework (KKNI) [1] requires that vocational graduates should have the competence, capable of performing a specific task and have basic operational knowledge of the specific areas of work.

To achieve the required competencies in KKNI, SMK graduates should not only have the theoretical capability but also must have the ability in the field of practice. Prosser [2] stated "Vocational education will be efficient if the environment in which students are trained is a replica of the environment in which she will work". In other words, SMK should have facilities adequate practice in order to have the competencies expected by the world of work.

Of the few studies that have been conducted on the feasibility of facilities and infrastructure practice [6] [7] [8], it was found that many SMK does not have the facilities and infrastructure adequate practice, this is caused by the lack of funding for the provision of facilities and infrastructure such practices, Prosser [2] states that "vocational education requires a certain cost and if it is not met then the vocational education should not be forced to operate". So that SMK has limited funds may have facilities adequate practice necessary to develop facilities and infrastructure practice at an affordable price, which has the same specs as a practical tool available today. One effort that can be done is to replace the existing practice facilities currently using the software in the form of a simulation program.

The simulation program has been developed by software developers such as Matlab, Proteus, Labview. The simulation program can be used to simulate the existing practice in vocational, just can not be made as a replica of a practical tool in SMK today. Therefore, this study aims to develop a simulator which is a replica of a practical tool in SMK today. With the simulator, SMK has limited funds can be used as a substitute for practice. With the tools of practice, vocational school graduates can increase their competence.

II. BASIC THEORY

1. Simulation

According to Thiagarajan[3] "Simulations create situations that are analogous to Certain aspects of reality".

Simulations by Heinich[4] is "An abstraction or simplification of some real-life situations or processes. In the simulation, participants usually play the role of involving them in interactions with others or with elements of a simulated environment ".

Of the two theories can be concluded that a simulation is an event or condition that made such actual events or conditions, by simulation, the simulation participants will gain the knowledge and skills to deal with events that real.

According to Joyce & Weil [5] simulations in education can be done in several forms, namely:

a. role-playing
b. Sociodramas
c. Game
d. Peer Teaching

2. Simulation Program

Simulation is a software program that is designed to be able to simulate an event like the

actual incident. The simulation program is an application program that can be made using commonly used programming languages such as Visual Basic, C ++, Delphi or Java. In this research, the programming language used is C ++ language. In order for the programming language can be made into a simulation program needs to add some algorithm. The algorithm is a provision - the provision used as a reference in the simulation to be made, an example of an algorithm for the simulation of the AND gate as table 1.

Table 1. Algorithm AND gate

IN 1	IN2	OUT
0	0	0
1	0	0
0	1	0
1	1	1

3. Digital Technique

course in digital engineering is a core lesson for vocational electronics group, the purpose of this lesson is to give knowledge to the students about the components - digital components and the principle of digital circuits.

In subject digital techniques, the main material is taught to students is about:

a. Gate basic
b. Flip-flop
c. Register
d. Decoder

III. METHOD

the method used in this research is the R & D, in which the author develops equipment practice is used for this (in the form of hardware) into equipment practice shaped software and a study of the literature for these practice equipment to meet the feasibility standards (effectiveness. Practicality and validity).

IV. DESIGN

The simulator that will be made in this study is a simulator that can simulate all the lesson material in digital techniques. Therefore, the simulator is divided into several modules, where each module can simulate the subject matter.

1. Basic Gateway Module

The basic gate module is a module that can simulate the characteristics of basic digital gate techniques. Basic gate module design as shown below.

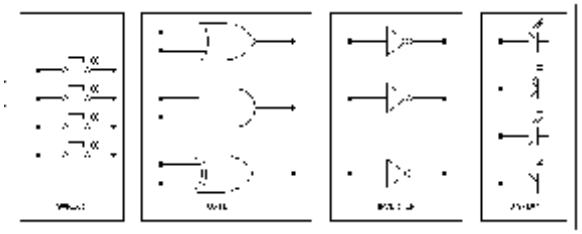

Fig 1. Basic Gate Module

2. Module Flip – Flop

Module flip-flop is a module that can simulate the characteristics of a flip-flop. The design of the module flip-flop as shown below.

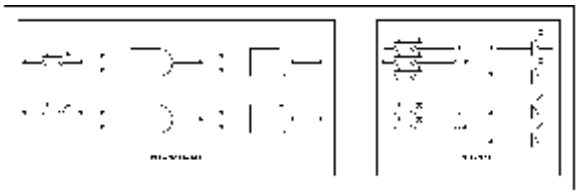

Fig 2. Module Flip – Flop

3. Register Module

In the module register, students can see the characteristics of the register. Image module registers as below.

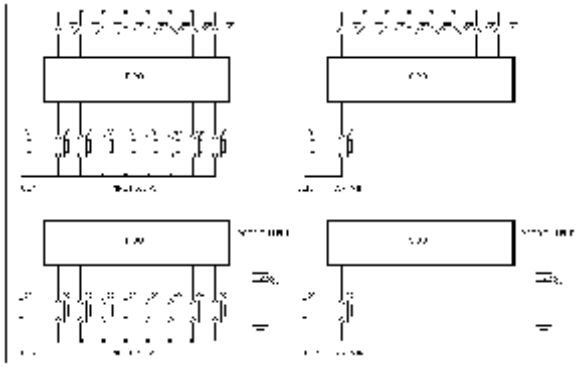

Fig 3. Module Registers

4. Module Decoder

In decoder module, students can see the characteristics of the decoder. Image decoder module as below.

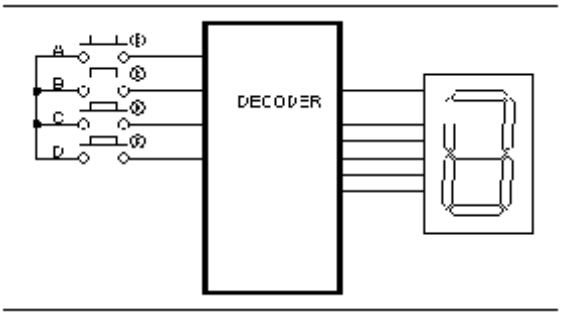

Figure 4. Module Decoder

V. CONCLUSION

graduate vocational competence can only be enhanced by providing skills to students. Students in vocational skills acquired from practice in schools and practice in the world industry / world of work.

Limited funds can not make much vocational facilities and infrastructure providing adequate practice, so it is difficult to increase the vocational competencies graduates, with the simulator is expected to help SMK who have limited funds, improve the competence of their graduates.

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