

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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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 students and 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, Innovation on applied engineering and information technology, Management and Leadership on TVET, Vocational and Technical Teachers education, and Assessment and Evaluation on TVET.

Sustainable society should 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 a productive generation have to be creative and innovative to face the competitiveness. So this proceeding 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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DIFFERENCES IN LEARNING OUTCOMES IN THE PRACTICE OF MICROCONTROLLER SYSTEM USING MCS51 MICROCONTROLLER TRAINER KIT

Edidas¹ dan Dedy Irfan²

¹Department of Electronic Engineering, Fakultas Teknik

Universitas Negeri Padang

*Corresponding author, e-mail: edidasunp@yahoo.com

Abstract

This paper describes the differences in learning outcomes in the practice of Microcontroller System using MCS51 Microcontroller Trainer Kit. Trainer Kit The MCS51 microcontroller is tested to Electronics Engineering students who are studying in practice of Microcontroller System. The research method used is quasi experiment. The experimental class uses the MCS51 Microcontroller Trainer Kit as a medium of controlled learning medium using a self-assembled circuit on the Project Board. The results show that the learning outcomes of the experiment class is better than the control class.

Keyword: MCS51 Microcontroller Trainer Kit, Quasi Eksperimental

1. INTRODUCTION

In this article is discussed about determining differences in learning outcomes that occur if media MCS51 Trainer Kit Microcontroller used in learning Microcontroller System. The research was conducted in the class of practice of Microcontroller System at the Department of Electronic Engineering, Universitas Negeri Padang in the even semester of academic year 2013/2014.

2. LITERATURE REVIEW

Trainer Kit Microcontroller MCS51 is a learning media that can simulate various display programs that can be done by microcontroller system. In relation to Nesbit's simulated learning in Joyce, Weil & Calhoun (2009: 443) states that: "Simulations can stimulate learning about: 1) competition; 2) cooperation; 3) empathy; 4) social system; 5) concepts; 6) skill; 7) efficacy; 8) serving a sentence; 9) the role of opportunity / opportunity; 10) the ability to think critically ". Simulation learning can increase healthy competition among learners who practice. Learners who left behind practice materials will try to catch up, so the practice process can be more passionate

and excited. During simulation learners are trained to conduct positive cooperation to work on an activity by working on sub-activities that the results can be synergized. Besides, if any of the friends who are late or even meet a dead end in doing the simulation can be helped by way of encouragement or other ways. Unfinished friends working on their simulated practice tasks should be waited until completion because the results of the practice should be collected in groups. It will train the empathy of learners who are studying. In terms of synergies as well as simulation learning can also train students in social interaction.

1. Learning by simulation method can also stimulate learners to construct scientific concepts. By doing simulation exercises learners can gather their experiences to construct the concept of a science. The more students learn to simulate, the more learning experiences they can get, the better the concepts they can get.

2. Similarly, simulated learning can train the skills that will be owned by learners who are learning. Repetitive simulation exercises cause habituation to learners to deal with the difficulties that occur in microcontroller programming. The difficulty can be program error caused by syntax

error or other writing errors. If learners are familiar with the difficulties encountered and always try to find a solution it will result in their skills better.

3. RESEARH METHOD

The research method is quasi experiment where the research subject consists of experiment class and control class. The experimental class used MCS51 Microcontroller Trainer Kit in its practice lesson, while the control class did not use it. After the learning took place eight times the meeting conducted measurement of learning outcomes, then analyzed.

Student competency competency variable (Y) based on the assessment of the level of ability obtained by students after following the learning using MCS51 Microcontroller Trainer Kit (X). The learning competence variable is organized into indicators such as: (1) cognitive ability; (2) psychomotor abilities; and (3) affective ability. The research hypothesis is that learning using MCS51 Microcontroller Trainer Kit is better than that do not use it.

Data of research result as seen in Table 2. Learning outcomes from the experimental group and control group. To test this hypothesis is used univariate analysis, by the help of SPSS.

Tabel 2. Learning Outcomes

| EXPERIMENT GROUP | | | CONTROL GROUP | | |
|------------------|---------------------|--------------|---------------|-----------------------|--------------|
| Resp. | Using Trainer (0/1) | Compet ences | Resp | Not use Trainer (0/1) | Compete nces |
| 1 | 1 | 4.027 | 1 | 0 | 3.272 |
| 2 | 1 | 2.862 | 2 | 0 | 3.406 |
| 3 | 1 | 3.731 | 3 | 0 | 3.528 |
| 4 | 1 | 3.346 | 4 | 0 | 3.384 |
| 5 | 1 | 2.025 | 5 | 0 | 3.906 |
| 6 | 1 | 4.027 | 6 | 0 | 3.328 |
| 7 | 1 | 4.415 | 7 | 0 | 3.15 |

| | | | | | |
|----|---|-------|----|---|-------|
| 8 | 1 | 3.923 | 8 | 0 | 3.506 |
| 9 | 1 | 3.927 | 9 | 0 | 3.984 |
| 10 | 1 | 3.919 | 10 | 0 | 3.784 |
| 11 | 1 | 2.862 | 11 | 0 | 2.972 |
| 12 | 1 | 3.350 | 12 | 0 | 3.272 |
| 13 | 1 | 3.246 | 13 | 0 | 2.828 |
| 14 | 1 | 3.442 | 14 | 0 | 2.972 |
| 15 | 1 | 3.35 | 15 | 0 | 2.828 |
| 16 | 1 | 3.731 | | | |

Analysis is done through the following consecutive menus: Analyze → General Linear Model → Univariate → Univariate Dialog Box → Enter the Y Value Variable into the Dependent Variable box → Enter Group Variables and Variables_Y to the Fix Factor (s) box → Options → Check Descriptive Statistics → Continue → OK. So that displays the results of the analysis in the form of descriptive data table 3. Descriptive Statistics The mean figures for each of the variables tested in the control group and the experiments in the descriptive data table were compared. A higher mean number of a variable indicates a better group for the variable being tested. The experimental group had an average learning outcome of 3.708 higher than the average learning outcome of control group only 3.446. Thus it can be concluded that learning using MCS51 Microcontroller Trainer Kit is better than those not using it.

Table 3. Descriptive Statistics

| Descriptive Statistics | | | | |
|------------------------|------------|----------|----------------|----|
| GROUP | VARIABEL_X | Mean | Std. Deviation | N |
| CONROL GROUP | Total | 3.445923 | .5027442 | 30 |

| | | | | |
|------------------|-------|----------|----------|----|
| EXPERIMENT GROUP | Total | 3.708778 | .4473527 | 32 |
| Total | Total | 3.581590 | .4892865 | 62 |

4. CONCLUSION

The learning of microcontroller using MCS51 Microcontroller Trainer Kit is better than those not using it.

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6. AUTHOR'S BIOGRAPHY

Edidas, is a lecture in the Department of Electronic Engineering, Universitas Negeri Padang. I live in Jl. Delima IV nomor 66 Perumnas, Belimbing, Kuranji Kota Padang. My contact E-mail is edidasunp@yahoo.com.

7. AUTHOR'S CONTRIBUTIONS

Dedy Irfan: Conception and drafting the article. Rusnardi Rahmat Putra: Critical reviewing and final approval of the version to be submitted.