

Thesis Title	A Comparative Study of Learning Achievement Gained from Conventional and Investigative Laboratory Instruction using Electronics Workbench on a Switching Regulator
Thesis Credits	6
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Degree of Study	Master of Science in Industrial Education
Department	Electrical Technology Education
Academic Year	1999

Abstract

This research aimed to develop an investigation laboratory based on the electronic content of a Switching Regulator and to compare its instructional efficiencies with a conventional laboratory. The researcher believed that the investigation laboratory could yield better prospect for learning than the conventional laboratory. Much emphasis was put on content and task analysis to secure precise information for the development of laboratories and tests to assure learning achievement and investigative abilities.

Initially a Switching Regulator circuit was designed to work with computer software called Electronics Workbench. Two types of laboratories were then created. The first utilized investigative experimental steps: problem sensing and analyzing, hypothesizing, and hypothesis verification. The second consisted of cause and effect experimental steps. Knowledge and skill extracted from both experimental processes were formulated on to laboratory sheets. All laboratories were approved by lab experts with the index of 0.6-1.0.

Two types of 4 multiple choices test were constructed to evaluate laboratory instructional efficiency. The first 30 test items evaluated students' learning achievements while the other 30 assessed investigative abilities. The two tests were unanimously approved by a

group of test experts with the average index ranging from 0.94, 0.76 difficulty index 0.53, 0.48 discrimination power 0.57, 0.48 and reliability 0.85, 0.87 respectively.

Thirty five first year electronic students from the Science in Industrial Technology department of Rajabhat Institute, Nakhonpathom, were randomly selected as a sample of the study. Sixteen of them were assigned as an experimental group to learn with the investigation laboratory. Another 19 students was assigned as a control group to learn with conventional laboratory. Both groups were pre-tested to ensure they possessed the required knowledge and skill for the experiment.

Comparing average score of learning achievement and investigative ability, it can be concluded that there is significant differences, at the level of 0.05, between both group. Further statistical analysis of scores also indicated that, at the level of 0.05, the experimental group students performed better than the control group students in the abilities of observation, and explanation of cause-effect relationship. The study also found at non-significant level of 0.05, that the experimental students performed better in the phenomenon prediction, situation controllment, knowledge application, and content learning achievement.

The research, however, revealed that the computer software program used in the experiment does not give a satisfactory result due to the fact that most student were handicapped in manipulating a computer. The experimental group students spent longer time in job execution due to the complexity of the investigation laboratory. They asked for help more than the controlled grouped students.

Keywords : Investigation Laboratory / Conventional Laboratory /

Electronics Workbench Program / Switching Regulator