Engineering Development Control Module as A Result of Efforts to Improve Learning in Electrical Engineering Universitas Negeri Surabaya

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Engineering Development Control Module as A Result of Efforts to Improve Learning in Electrical Engineering Universitas Negeri Surabaya

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Abstract - **This research was aimed to develop Festive Module Settings technique uses cooperative learning-based trainer to consider the demands of the students to the science of understanding the competence of control and its applications in the field of Electrical Engineering.A completely applications of control in the field of Electrical Engineering becomes an important consideration in this study because it has the aim to topics and teaching materials presented during the learning can contribute the maximum to the conformity of knowledge obtained with the application in the field and improve the quality of graduates of the Department of Electrical Engineering Universitas Negeri Surabaya , With the module and trainers are expected to be used by educators in delivering teaching materials with practical and as a reference for setting technique taught courses. The use of this trainer modules and aims to prepare student to be able to apply the theoretical knowledge gained control over the college in the field of Electrical Engineering so that students understand and know how its application in the field.Modules and trainers who have been made subsequently to 5 validator validated the results are as follows, the results of a feasibility assessment of the module Teaching Subjects Techniques Action Control Basic Control System developed is high. The analysis results obtained from the validator is 79.92% for modules and 76.8% for the trainer. Then tested is limited to 10 students of Department of Electrical Engineering who has been programmed settings. From the results of student responses to the module is 81.36% and 80.8% for the trainer. Festive module so Courses Action Control Basic Engineering Control System for Cooperative Learning Model developed and feasible should be applied to the lecture course setting techniques.**

Index Terms - Cooperative learning, teaching modules, trainer, control system.

I. INTRODUCTION

Department of Electrical Engineering studying plans for the development lab, in particular laboratory control system, the teaching team setting techniques also prepare a plan for the lab development with emphasis on lab module is accompanied by a trainer or a kit.

To answer these problems one of which is to conduct research involving partner research teams that have qualified lab and has a lot to contribute in the field of system settings. Researchers are partners of the Department of Electrical Engineering ITS who already have laboratory control system that can be used as a reference laboratory development and learning devices. The research conducted was to develop experimental module course setting technique uses cooperative learning-based media trainer. From these results the students know and understand the application of regulation in the field of industrial engineering. In addition, it can also motivate student learning in university classes. It is very supportive competence of students before plunging into the world of work, especially for graduates of the Electrical Engineering Department of Surabaya in which will work as a vocational teacher or plunge into the world of industry.

II. LITERATURE

According Trianto 2007, learning that take shelter in the constructivist theory is cooperative. Cooperative learning comes from the concept that students will more easily find and understand difficult concepts if they were in discussions with his friend. Students regularly work in groups to help each other solve complex problems. So the social nature and the use of peer group becomes the main aspect in cooperative learning.

According Sugiyanto 2010, cooperative learning itself is a learning approach that focuses on the use of small groups of students to work together to maximize the learning conditions in achieving the learning objectives.

There are six major steps or stages in a lesson using cooperative learning. The lesson starts with the teacher deliver a lesson objectives and motivate students to learn. This phase was followed by the presentation of information, often with the substance of the verbal readings. Furthermore, students are grouped into teams to learn. This stage followed the

guidance of teachers when students work together to complete the task with them. The last phase includes a percentage of the final results of the working group or evaluation of what they have learned and give tribute to the efforts of groups and individuals.

The module is a program unit of teaching and learning smallest detail outlining: a) The purpose of general instructional, b) The purpose of instructional specifically, c) Principles of the material to be learned and taught, d) Status of the function unit in the unity of the program that will be used, e) teaching and learning activities, f) Statute of work that will be done during the learning process takes place (Wijaya: 1996). Furthermore, according to Nasution (1982: 205) module is a complete unit that stands alone and consists of a series of learning activities designed to help students achieve a number of objectives that are formulated specifically and clearly.

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Development of the device refers to the four D models proposed by Thiagarajan, Semmel (1974: 5). 4-D Model consists of four stages but held only 3 stages alone that define, design and develop.

The indicators instrument used in this study refers to the format indicator instrument Fauzi Amin in Siara (2004) cited Purdiana (2004: 28).

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III. RESEARCH METHODS

Results indicators in this study were 1) the manufacture lab module Action Basic Control System course on regulation techniques and 2) the manufacture trainer for practical action on the Control System Basic engineering courses as a companion module settings.

The research instrument is a tool or facility used by researchers to collect data so that job easier and the results better, in the sense that a more thorough, complete, and systematic so more easily processed (Arikunto, 1997: 151).

Instruments in this study include the validation module sheet and sheet student questionnaire. This instrument is used to collect data for an expert assessment of the lab module. This assessment is then used as the basis for revising the modules developed. Assessment module validation were analyzed using descriptive statistics in the form of the average score. To determine the level of quality of learning outcomes using test instruments and performance and to determine the level of activity of students using the observation sheet instruments

The data obtained in this study were collected through a questionnaire sheet gives validation to the module expert lecturers and professors of engineering experts as well as a questionnaire to the student of 2012 in the Department of Electrical Engineering program and following the lecture Mechanical Settings.

Action Trainer Basic Control System is a product of learning media development in this study. With this medium, students are expected to understand the material and able to apply it. If used as a medium of learning the trainer is then used as a test practice someday. It is necessary for validation before being used as a medium of learning and research instruments. Validate the form of logical validity is done by providing validation sheet for lecturers are experts in the control system. There are several expert lecturers in their respective fields for the validation process were: expert trainer design, module design experts, expert control system, and experts substance. Here are the lattice sheets trainer validation response in Table 1.

Table 1. Validation Trainer

No	aspects examined
	The quality and look of the media
1.	Display Trainer
2.	Selection of Size and Shape Trainer Board.
3.	Trainer performance
4.	In the language Understandable Trainer
5.	Linkage media in accordance with Module

Basic Actions modules developed Control System consists of modules and module lecturers students. Student module contains material, practicum and formative tests, while the lecturer modules contain material, practicum, formative test, and answer formative tests. To that end, the module also needs to be validated before use. Forms and methods of data collection module validation together with validation trainer. Here is a lattice sheet module validation response in Table 2.

Table 2. Validation Module

NO	Rated aspect
1.	**Typographical arrangement and**

	layout a. The face of the cover has an appeal. b. Face load module element module title, author name, c. Cover picture depicts the contents of the module.
2.	**illustration** a. The information presented clearly legible. b. The sequence of images and text are interrelated. c. The picture is quite clear (not blurred). d. Captions and tables are quite clear.
3.	**language** a. Easy to understand language b. Indonesian language is good and right
4.	**contents** a. The level of the material in the module concept of truth. b. Fill material in accordance curriculum modules. c. Sufficient information on the module. d. Questions / tasks encourage the activity of the students. e. Worksheets on module according to media trainer.
5.	**Font and size of the material** a. Font size proportional and legible. b. The length and width of the module is considered economically module production.

IV. RESULTS AND DISCUSSION

With questionnaires given knowable feasibility trainer devices are made. Feasibility done by responding to a Likert scale, among others, the criteria are very good, good, fairly good, less good and not good. To analyze the answers validator and student response analysis, researchers used descriptive statistics on average scores.

Results of the validation by 5 validator and test is limited by the 10 students of the Department of Electrical Engineering depicted in Figure 1, Figure 2, Figure 3 and Figure 4 below.

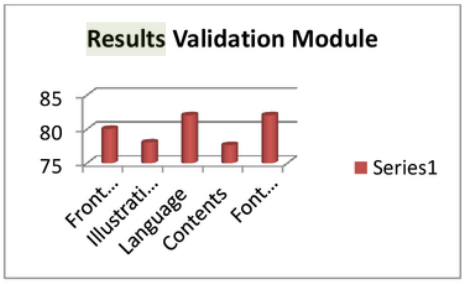

Figure 1. Results of the validation module by 5 validator.

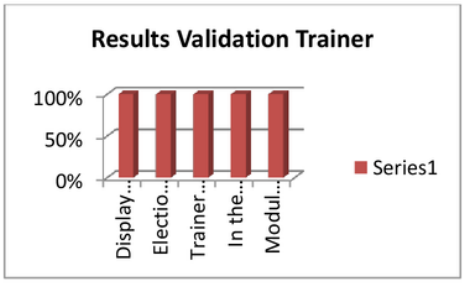

Figure 2. Results of the validation trainer by 5 validator

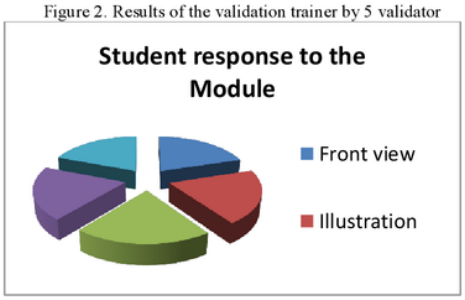

Figure 3. Results of response module by 10 students

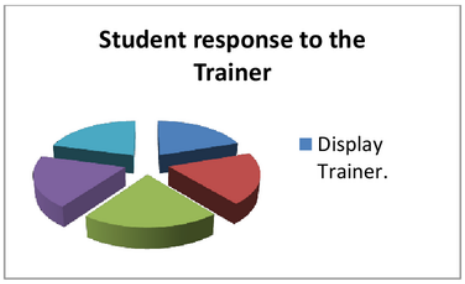

Figure 4. The result of trainer response by 10 students.

In a media trainer basic action of this control system, there are several functions, among others, to understand the control action proportional, integral, derivative, proportional and integral, proportional and drivatif and proportional integral and derivative. Refers to the manufacturing module based Handbook of Surabaya in 2014-2015 for the Faculty of Engineering Department of Electrical Engineering at the Technical Settings subjects.

Modules and trainers who have been prepared then validated on 5 validator consisting of faculty learning experts, engineering experts and grammarians. From the data sheet instrument obtained an average assessment is 79.92 validator of the modules included in either category. While the results of the assessment of the trainer validator is 76.8 which is included in both categories. From the results of these assessments, the module can be quickly duplicated to the next will be tested is limited to students engineering courses Electrical Engineering Unesa settings.

From the results of the student's response is known that the appearance rating tainer 82%, selecting the size and shape trainer board 82%, 84% performance trainer, trainer easily understood language in 80.8%, and according to the media connection module is 78%. So that the overall response of the students to the trainer of 80.8%. Being a student responses on the module are as follows, disposition and layout of 82.67%, 81% illustration, language of 91%, 78% and the contents of the letter and the size of the material to 87%. So that the overall results of the validation media viewed from 5 aspects is 81.36%.

From the results of all responses are categorized very well could be concluded, that the students are very interested in the trainer and eager to understand more deeply study the basic action trainer control system to add knowledge about control systems.

V. CONCLUSION

Based on the results of data analysis and discussion, it can be concluded as follows. 1) Has been successfully developed Teaching Subjects Techniques Module Action Settings Basic Control System for Cooperative Learning Model As Efforts to Improve Learning Outcomes in the Department of Electrical Engineering FT Unesa designed using 4-D (four D model) in the course of Engineering settings. 2) The results of the feasibility assessment of the module Teaching Subjects Techniques Action Settings Basic Control System for Cooperative Learning Model As Efforts to Improve Learning Outcomes Quality in the Department of Electrical Engineering FT Unesa developed is high. The analysis results obtained from the validator is 79.92% for modules and 76.8% for the trainer. From the response of the students was 81.36% for modules and 80.8% for the trainer. Festive module so Courses Action Settings Basic Engineering Control System for Cooperative Learning Model developed and feasible should be applied to the lecture course setting techniques.

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