EVALUATING THE ASSESMENT SYSTEM OF BASIC COURSES IN THE DEPARTMENT OF ELECTRICAL ENGINEERING

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ABSTRACT

This study aimed to examine the assessment system of the students' learning outcomes in the basic courses of engineering at Electrical Engineering Education Program, Faculty of Engineering UNY. The investigation included the aspects of planning, implementation, and outcomes. This was an evaluation study which employed a countenance-stake evaluation model. Its main concern was the assessment system of students' learning outcomes in engineering basic courses at Electrical Engineering Education Program, Faculty of Engineering UNY, including the aspects of planning (antecedent), implementation (transaction), and outcomes (outcomes). The results showed that: (1) the antecedent aspect was noticeably quite good, (2) the transaction aspect was categorized as good and quite good by the lecturers and the students respectively, (3) the outcomes aspect was categorized as quite good both by the lecturers and the students.

Keyword: assessment, evaluation, learning outcomes

INTRODUCTION

The advantage of human resources (HR) with high competitiveness will be a special bargaining power in this globalization era. In this regard, education at all levels, including in the Department of Electrical Engineering Education, Faculty of Engineering, Universitas Negeri Yogyakarta has a very important role to meet the human resources that can compete both nationally and internationally. According to the curriculum of Electrical Engineering Program (Faculty of Engineering, 2014) the graduates are expected to have a series of competences, i.e. (1) designing a series of automatic controls at production process machines or its electrical installations in industries, (2) setting installations and automatic controls at production process machines in industries, (3) operating electrical equipments and industrial control systems. Curriculum 2014 consists of several courses that cumulatively lead to the achievements of graduate competencies. Some of the basic subjects that should be taken by students in the first and the second semester are ones which are essential for the underlying masteries of the materials in the next semesters. Some of the courses include: Basic Electricity, Electricity Circuit, Mathematics, Physic, Electronics, Technical Drafting, Digital Technique, Electrical Machine, and Mechanical Technology. Students should completely master the whole basic courses to help them continue to the materials in the next courses. In facts, the results of the students' achievement in those basic courses were inadequate. Even the graduation rate with minimum score of B- in most basic subjects was less than 60% and many of the students took the courses more than twice.

Muchoyar et al. (2013) explains the leading factors of the poor students' outcomes are the implementation of learning, the compact lecture time, and the inhibiting factors coming from the students themselves. The problems possessed by teachers in implementing learning assessments are: (1) difficulties in developing assessment instruments which meet the indicators, and (2) observing students individually because of the number of students (Manap, 2009).

There are at least 2 fundamental issues related to learning process as the main concerns: (1) to which extend the effectiveness of the lecturers in conducting the instructional process and assessment and (2) to which extend the students can learn and master the learning

materials as expected. Learning process will be effective if teachers or lectures are able to deliver the overall learning materials and students can master the materials in accordance with the learning goals. Often, lecturers feel satisfied as they succeed in delivering the materials as planned. In fact, not necessarily the whole materials can be completely mastered by the students. Even, it is not uncommon that the lecturers themselves do not know that the learning activities that have been implemented is less appropriate with the student condition.

Stufflebeam (Issac & Michael, 1981) defines evaluation as the process of delineating, obtaining, and providing useful information for judging decision alternatives. The evaluation results by the Department of Electrical Engineering Education of the first half academic year of 2015/2016 showed that the learning process was less attractive, the learning outcome assessment was less transparent, and the low utilization of time allotment, and the low achievement of students. The study and the improvement conducted so far concern more towards learning, such as innovative methods and learning media, learning materials, and learning support facilities. A comprehensive study which concerns on the assessment system of learning outcomes has not been sufficiently conducted, especially in engineering basic courses.

Indeed, the assessment system at the level of the Faculty is regulated based on the guide published by Faculty of Engineering which is in quite good, but unspecific. The field implementation practice has not been operationally regulated. System-level assessment of learning outcomes in the Department of Electrical Engineering Education has not been regulated in specific ways in accordance with the natures and characteristics of the department.

Angelo & Cross (1993) explain that learning outcomes can be defines as the ability to shape students' behavior in the aspects of cognitive, affective and psychomotor after receiving learning experiences.

Learning outcomes achieved by students are the goal of learning activities. Bloom (Gronlund & Linn, 1990) proposes a taxonomy that includes three areas of learning outcomes, namely cognitive, affective, and psychomotor. The perceived cognition can be classified into four dimensions: namely factual, conceptual, procedural, and principle. Affective as a result of learning is explained as stances of accepting, responding, assessing, organizing, and conceptualizing values. Psychomotor consists of movement, communication skills, adjustment patterns of movement, and creativity.

According to Harris & s Bell (1994), the success of learning can always be measured from the learning outcomes. It means that learning is considered effective if the learning outcomes improve as expected. The real evidence of learning outcome improvements is the reciprocal influence between learning and assessment. The learning process which has been implemented will be assessed in accordance with the existing regulations, meanwhile the result of these assessments is an overview of the results of student learning. Then, the merits of a learning process can be seen from the results of student learning. In other words, the level of student learning outcomes represents the quality of learning processes and efforts that have been made.

With regards to the importance of assessment role in the learning achievement, a study on evaluating the assessment system of students' learning outcomes is necessary to be conducted, especially in engineering basic courses at the Department of Electrical Engineering Education, Faculty of Engineering UNY such as Basic Electricity, Electricity Circuit, Mathematics, Physic, Electronics, Technical Drafting, Digital Technique, Electrical Machine, and Mechanical Technology.

METHOD

This was an evaluation study which employed an evaluation model of *Countenance-*

Stake. The population of this study consisted of lecturers and students who were taking and had ever taken the basic courses of engineering at Department of Electrical Engineering Education. All lecturers teaching the engineering basic courses, consisting of 10 lectures, were selected as the research samples. As for the students, the research sample was determined by stratified random sampling technique. The students taking the basic courses of engineering from the academic year of 2015, 2014, 2013, 2012, and 2011 were proportionally selected, with the total sample of 80 students. Each student filled instruments for three different subjects. In this case, the rule regulation on student respondents who filled out a questionnaire on specific engineering basics subjects is a necessity in order to make them more focused and accurate in answering the questionnaires.

The evaluation on the assessment system of group learning achievements in the basic courses of engineering was carried out with the steps outlined as follows: (1) determining research focus, (2) examining academic regulations on lecturing and assessment, (3) conducting pre-survey on the lecturing of engineering basics courses, (4) developing instruments of assessment, (5) collecting data (observation, interview, documentation, questionnaire), (6) analyzing data, dan (7) writing reports. The collected data were analyzed with quantitative and qualitative descriptive techniques. The data analysis was directed according to research problems.

The expected outcomes of the assessment system evaluation were presented in the form of recommendations on how to enhance the implementation of learning outcomes assessment in engineering basic courses in order to achieve the expected results and what things needed to be done by the relevant parties. Recommendations that lead to decision making were based on the results of evaluation. In quantitative terms, the existing assessment system should be continued (with a minor improvement), if the overall results of the evaluation is categorized as good. If it is no categorized as good, then there should be major improvements to carry out the existing assessment system. If it is noticeably poor, then the existing assessment system should be reconstructed.

RESULTS AND DISCUSSION

Data description on the evaluation of learning outcomes assessment in the basic courses of engineering include the aspects of antecedent (preparation assessment), transaction (implementation assessment), and outcomes (outcomes assessment). The data was quantitatively presented by mean, deviation standard, mode, median, and frequency distribution completed by its diagram. The results of the evaluation of students' learning outcomes assessment in the preparation process (antecedent aspect) were obtained from the questionnaires distributed to 10 lecturers who taught basic courses of engineering. The questionnaires consisted of 20 questions. The data analysis showed that the mean, the median and the mode were 59, 58, and 56 respectively while the standard deviation, the minimum score and the maximum score were 5.944, 51, and 70 respectively. The scores distribution model is presented in Figure 1.

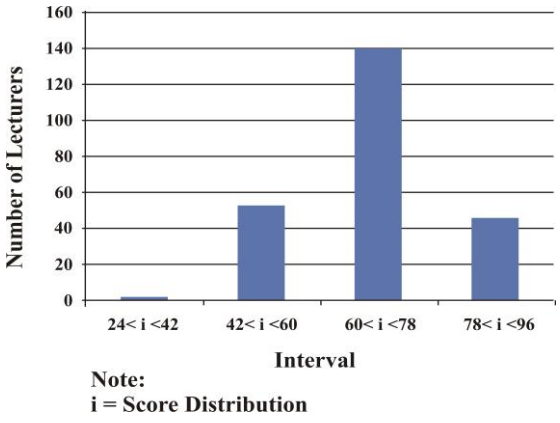

Figure1. The Results of Antecedent Aspect Evaluation

The result of data analysis on antecedent aspect evaluation from lecturers' opinion showed the mean score of 59 categorized as good with the ideal highest score and the ideal lowest score of 80 and 20 respectively. The mean score was relatively far below the ideal highest score, conveying that there should be improvement in several aspects of the components in the preparation of students' learning outcomes assessment. Based on the data from observation and documentation, all lecturers had prepared the semester learning plans and learning outcomes assessment plans. However the assessment instruments were incomplete and did not accommodate the affective aspects (attitude).

The evaluation of transaction aspect in the implementation of students' learning outcomes assessment was conducted by administrating questionnaires to 10 lecturers who taught basic courses of engineering. The questionnaire had 26 question items. The results of data analysis revealed that the scores of mean, median and mode were 86.30, 82.50 and 82 respectively while the standard deviation, the maximum and the minimum scores were 6.97, 80 and 99 respectively. Based on the score of frequency distribution, the respondents who gave the score in the interval category of very poor, poor, fair and good were 0%, 0%, 60% and 40% respectively. It implied that the evaluation in the aspect of transaction was categorized as good. The visual model of score distribution is displayed in Figure 2.

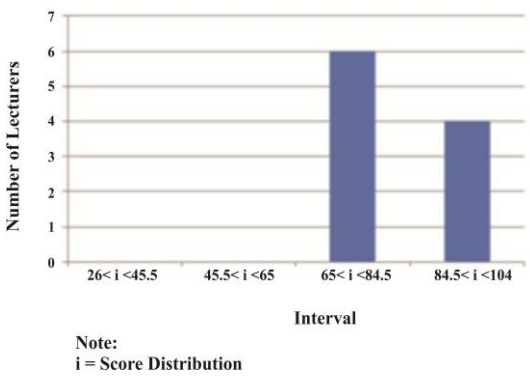

Figure 2. The Results of Transaction Aspect Evaluation by Lecture Respondents

The data analysis on the transaction aspect evaluation, according to lecturers' point of view, revealed the mean score of 86.30, classified as good. The highest and the lowest ideal scores were 104 and 26 respectively. The mean score was relatively below the ideal highest score. This indicated that the implementation process was appropriately conducted. Nevertheless, 3 items in the instruments were categorized as poor, which were associated with: (1) implementation of assessment related to the prior competences required, (2) assessment or observation related to the students' interest and motivation, and (3) discussion of the test results. Those three points were not performed adequately by the lecturers in the assessment implementation.

As for students, questionnaires were distributed to 240 students who enrolled in the the basic courses of engineering. The questionnaires had 24 items of questions. The results of data analysis revealed that the mean, the median, and the mode scores were 68.39, 69, and 65 respectively while the standard deviation, the minimum and the maximum scores were 10.38, 31 and 92 respectively. Based on the score of the frequency distribution the respondents who gave the score in the interval category of very poor, fair and good were 1 (0.41%), 53 (58.3%); and 46 (19.16%). The evaluation on the transaction aspect was considered fair. The visual model of score distributions is presented in Figure 3.

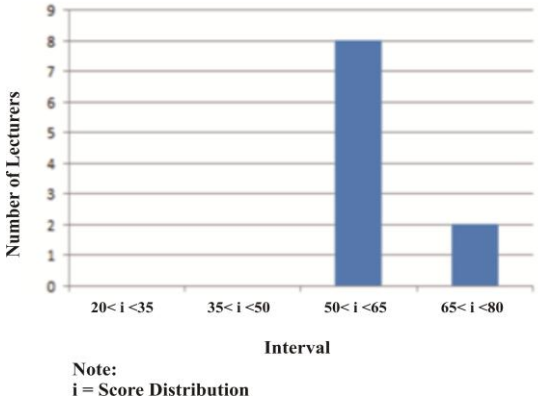

Figure 3. The Results of Transaction aspect Evaluation by Student Respondents

According to student respondents, the implementation of the assessment was considered quite good with the mean score, the ideal highest score, and the ideal lowest score were 68.39, 96, and 24 respectively. The results of data analysis on the transaction aspect from both respondents (lecturers and students) were relatively different. The student respondents suggested several points in the assessment system considered to be poor, such as the practice of daily tests, the correspondence of the daily tests, mid-term tests as well as final tests with the delivered materials and the difficulty level of mid-term test question items to the depth of materials.

The evaluation results of the outcomes aspect with lecturer respondents involved 10 lecturers teaching engineering basic courses. It was processed by primary data obtained from the questionnaire consisting of 14 questions. The results of data analysis revealed that the scores of mean, median and mode were 40.6, 40 and 40 respectively while the standard deviation, the minimum score and the maximum score were 4.90, 31 and 51 respectively. The frequency distribution score above showed that the respondents who judged the assessment system in the interval category very poor, poor, fair and good were 0%, 20%, 70%, and 10% respectively. Accordingly, the assessment outcome is categorized as fair. Figure 4 presents the visual model of the score distribution.

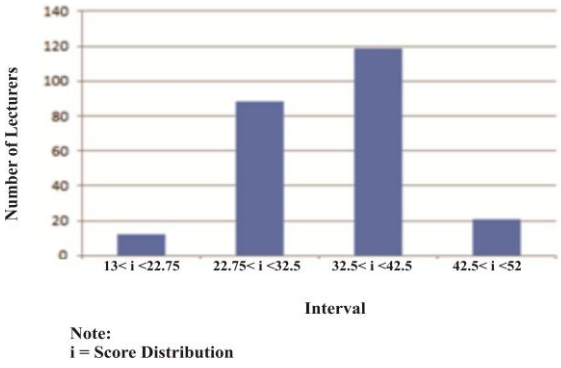

Figure 4. Outcomes Aspect Evaluation by Lecturer Respondents

Based on the result of data analysis on the evaluation of outcome aspect from lecturer respondents, the mean score was 40.6 categorized as fair, with the ideal highest score and ideal lowest score were 52 and 13 respectively. There were several items in the instruments classified as poor. They consisted of returning the exam answer sheets to students, the implementation of remedial tests for students, and re-discussion of exam materials.

As for the student respondents, the evaluation of the student learning outcomes assessment seen from the outcomes aspect was evaluated by 240 students who attended the lectures and utilized questionnaires consisting of 13 question items. The data analysis conveyed the mean, media and mode scores were 33.80, 34 and 32 respectively while the standard deviation, the maximum score and the minimum score were 6.42, 15 and 50 respectively. The frequency distribution score showed that the respondent who evaluate the aspect in the interval category of very poor, poor, fair, and good were 12 (5%), 88, 36.66%, 119 (49.58%) and 21 (8.75%) respectively. Accordingly, the outcomes aspect was categorized as fair. The visual model of the score distribution is presented in Figure 5.

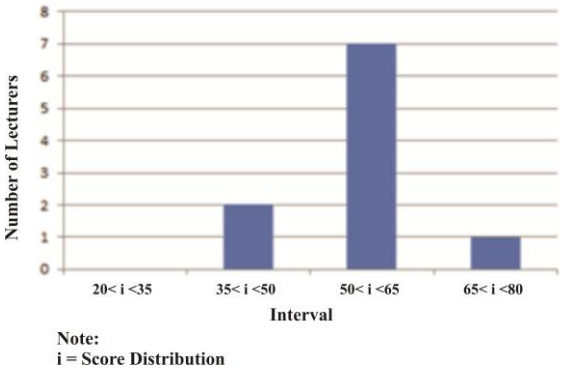

Figure 5. Outcomes Aspect Evaluation by Student Respondents

This is similar to lecturer respondents, the results of data analysis from student respondents conveyed the mean score, the

highest ideal score and the lowest ideal score were 33.80, 52, and 13 respectively. Several points in the assessment system considered poor. They consisted of returning the exam answer sheets to students, conducting discussion of test results, remedial tests for students, improvement of lecturers' teaching styles based on the assessment results, and the implementation of enrichment.

CONCLUSION

The assessment system of students' learning outcomes in the Department of Electrical Engineering Education for the engineering basic courses, from the aspect of antecedent it was categorized as good. Several points related to assessment planning were still poor such as: inadequate preparation of the daily tests, remedial and enrichment programs, and affective and psychomotor aspects in accordance with indicators. The learning outcome assessment of Electrical Engineering Education students in the engineering basic courses, from the evaluation on the aspect of transaction, was included in the category of good by the lecturers and fairly good by the students. Some items related to the assessment implementation which were poor consisted of the return of the exam answer sheets to students, discussion of the test results, remedial tests for students, improvement of lecturer's style of teaching based on the assessment results, implementation of enrichment. The learning outcome assessment of Electrical Engineering Education students in the engineering basic courses from the evaluation on the aspect of outcomes was categorized as quite good by both lecturers and students. Severalvpoints related to assessment outcomes which were poor consisted of the return of exam answer sheets to students, discussion of exam results, remedial tests for students, improvement of lecturer's style of teaching based on the assessment results, enrichment implementation, and the passing grade of engineering basic courses which was low.

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