Development of Performance Assessment Standard Career with Dichotomy Scoring as Competence Test at Vocational School

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Abstract—**The problem faced by vocational education is the low relevance of the results of vocational education with the demands of the world of work. One of cause the mismatch between educational programs and the demands of employment. One reason is a scoring system that places more emphasis on measuring knowledge for knowledge, rather than measuring original skills. Data shows that 60% of Vocational Senior High School graduates have low vocational competencies. One way to overcome the low level of vocational competence is the development of authentic career performance assessment standards in the form of dichotomy. The purpose of this research is to construct performance tests and scoring methods. Performance tests are developed through a deductive approach to judgment and an inductive approach based on the responses of the test participants. The development model used is a modification of the Borg model, mention as the ADDIE model consists of five stages, that is analysis, design, development, implementation, and evaluation. Validation of the contents of the performance assessment was carried out by 10 experts consisting of 7 (seven) subject matter experts, three learning assessment experts. Readability validation is done by 10 automotive vocational students. Data analysis used qualitative descriptive analysis and inferential statistics. Analysis of test items using CVR (content validity ratio). The results of the study were automotive competency performance assessments fulfilling the content validity test and 84% of the test items fulfilling the validity requirements.**

Keywords—performance tests; scoring methods; dichotomy scoring; vocational school

I. INTRODUCTION

The development of technology and the structure of work in society is a challenge that must be faced by vocational education. The direction of developing vocational education at the secondary education level is related to the position and repositioning of vocational education, including aspects of relevance, mention as the relevance of the process and educational outcomes to the needs of stake holders. The success of the relevance of educational institutions (Vocational High School) is measured by the performance of graduates in carrying out their profession in the workplace with the provision of knowledge, skills, attitudes and values obtained in educational institutions.

In the context of knowledge, students need to be equipped with the knowledge to carry out work and solve current problems, as well as the ability to predict future work development needs. In the context of skills, students need to be equipped with the skills or competencies to do relevant work in the workplace and solve problems that exist in the workplace. This means that the process of vocational education requires quality standards for vocational education.

One of several factors related to the quality standard of vocational education is the effectiveness of learning, which includes assessment of learning outcomes. What is learned at school are indicators of vocational education as providers of the labor market. Learning outcomes that are measured are cognitive abilities, attitudes and values (character) and skills.

Skills are measured by instruments of knowledge of performance and instruments for assessing skills to operate tools.

The reality in vocational high schools shows that learning outcomes assessment emphasizes the use of written assessment instruments and the assessment of knowledge of performance compared to authentic assessment forms of performance tests. This is a factor in the low level of relevance of the results of vocational education, namely the discrepancy between education programs and the demands of employment.

In performance assessment, teachers often assess performance test participants with scoring using weighting that is not in accordance with competency-based assessments. Competency-based performance assessments are more appropriate to use performance appraisals with dichotomous scoring forms.

The solution to overcome the problem of the relevance of the results of vocational education in the learning outcomes aspect is the development of competency-based performance assessments using dichotomous scoring.

II. THEORETICAL FRAMEWORK

A. Assessment Approach to Vocational Education

Vocational education has different characteristics from general education. Differences are reflected in aspects: (1) vocational education orientation (individual performance in the workplace); (2) justification for existence, in accordance with real needs in the workplace; (3) the benchmark / criteria for success are not limited to schools; (4) sensitivity to the development of the worplace; and (5) relations with society and the workplace [1].

Characteristics of vocational education, according to Wardiman are [2]: (1) vocational education is directed at preparing students to enter employment; (2) vocational education is based on "demand-driven" (workforce needs); (3) vocational education is emphasized in "learning by doing" and "hand-on experience"; (4) close relationship with the workplace is the key to the success of vocational education; (5) the focus of the content of vocational education is emphasized on feeling the knowledge, skills, attitudes and values needed by the workplace; (6) the actual assessment of student success must be "hands-on" or performance in the workplace.

The essence of vocational education is ownership of competencies in students that are relevant to the workplace, so they can work professionally. Professionalism in education needs to be interpreted as "he does his job well", meaning that individuals who receive recognition have competency types and levels of expertise in the profession in accordance with the requirements that apply to the field of profession.

The basis of professionalism is competence. The meaning of competence according to Spencer is [3]: "an underlying characteristic of an individual which is causally related to effective or superior performance in a job; (underlying character of a person that causes it to be able to show effective or superior performance in a job). This means that competency is the main factor possessed by the individual the best performer (superior achievement) that makes him different from average-performers (ordinary or average achievers).

There are two approaches of assessors in examining competencies, namely deductive and inductive approaches. The deductive approach in competency assessment, begins with the process of job evaluation (identification of job tasks), which produces an assumption about the profile of skills and abilities required to be able to carry out work tasks from the job (job) successfully. While the inductive approach, refers to the assessment activities in the form of identification of certain personnel who have been recognized as "best / superior performers in the job." In this study, competencies were examined through a deductive approach.

Deductive approach, assessment of technical vocational field competencies can be explored through "job evaluation" which can produce an assumption about the profile of skills and abilities required to successfully carry out the tasks of technology education work.

For example, to be able to become a beginner level CNC technician, the competency of CNC lathe technology is required, including the ability to turn knowledge, turning skills, and attitude in turning work. The knowledge ability of turning must be revealed in terms of knowing: lathe tools and techniques. Turning skills are shown through skilled use of CNC turning tools and techniques. Work attitude, expressed through attitude in turning jobs, such as occupational safety.

Thus the technical vocational technician competency standards in the deductive assessment perspective prioritize aspects of knowledge, skills, values and attitudes towards the field of work.

B. Performance Assessment of the Form of Dichotomy Scoring

Assessment is one of the most powerful educational tools for promoting effective student learning [4].

Performance assessment on vocational education is an assessment that requires students to apply the knowledge and skills they have in everyday life.

Performance tests are more "authentic" than paper tests, because the form of tests or assignments better reflects the abilities needed by students or students in everyday life. For example, a paper test is a test to measure knowledge and understanding of tools or machines (such as: knowledge or understanding of computers, lathes), while performance tests are tests that directly measure skills (performance skills), such as the ability to operate computers, operate skills vocational tools, and skills in repairing machines.

"Precise standards of measurement were required to ensure that each skill was mastered at the desired level. And because it was not possible to teach every student the skill every vocation, scientific measures of ability were also needed to predict one's future role in life and thereby determine who was best suited for each endeavor" [5].

The advantages of performance appraisal include: (1) students are skilled at doing a job. For example: automotive vocational students become skilled in terms of repairing cars or motorbikes, vocational school students are skilled in plant breeding. These skills cannot be known through a paper test instrument; (2) assessment or performance tests can be used to match the compatibility between theory and skill in practice; (3) students do not have the opportunity to cheat or opportunities for manipulation of student skills by the teacher or other students; (4) the teacher can get to know the characteristics of each student in depth, especially his competence in certain fields, so that the teacher can perform remediation in students in certain competencies that have not been mastered.

The steps for making a performance test or skill test according to the National Education Research and Development Center for Education and Training (2003) are as follows [6]: (1) identification of all important steps that are needed or that will affect the best outcome; (2) write down the behaviors of specific abilities that are important and necessary to complete the task and produce the best results; (3) try to make the ability criteria to be measured not too much, so that all criteria can be observed as long as students carry out the task; (4) clearly define the criteria of capability to be measured based on students' abilities that must be observable or the

characteristics of the products that produced; (5) sort the ability criteria to be measured in observable order; and (6) check again and compare with the ability criteria that have been made by other people or institutions or industries / factories (preferably adjusting to the competency standards made by the association or certification).

There are several ways of performance assessment, namely by using "rating scale" and "check lists". In this study the performance assessment was carried out by means of "check lists" in the form of dichotomous scoring, because of its ease. On "check lists" only provides two categories of assessments, namely yes-no or competent-incompetent. Yes (competent) assessment is given if students are able to show or perform according to work standards in the workfield. Dichotomy scoring means giving a score to a category (true = 1 and wrong = 0).

III. METHODOLOGY

The purpose of this research is to construct performance tests and scoring methods. Performance tests are developed through a deductive approach to judgment and an inductive approach based on the responses of the test participants.

The development model used is a modification of the Borg model, mention as the ADDIE model consists of five stages, that is analysis, design, development, implementation, and evaluation. Validation of the contents of the performance assessment was carried out by 10 experts consisting of 7 (seven) subject matter experts, three learning assessment experts. Readability validation is done by 10 automotive vocational students. Data analysis used qualitative descriptive analysis and inferential statistics. Analysis of test items using CVR (content validity ratio).

The place of research in two State Vocational Schools with Automotive expertise in Bandung. Time of study in July-August 2018.

IV. RESULT AND DISCUSSION

A. Result

The development of performance assessment in the form of scoring dichotomy in the study used the ADDIE development model. The research results are arranged based on 5 (five) stages of development as follows:

1) Analysis phase: The analysis phase is carried out to establish basic problems. In the analysis phase carried out by interviewing students and teachers in automotive subjects, the results of the analysis phase can be seen in table 1 below.

TABLE I. RESULTS OF THE INTERVIEW PHASE ANALYSIS

No	Question Focus	Student interview answers	Teacher interview answer
1	The problem of what happens to the evaluation of automotive learning ?	(1) The question is not clear. (2) Teachers often test the theory of knowledge.	Students cannot answer questions even though the problem is not difficult, often given theoretical tests, practical and simple.
2	Do you need a performance test tool in automotive learning ?	Need, so that the tests are the same as workshops or the automotive industry.	Very necessary, so that the test equipment is in accordance with the conditions of the work area
	Meaning: Evaluation of learning in automotive subjects is carried out by teachers more often through theoretical tests, rarely practical tests that fit the work area. According to the teacher, it is necessary to have relevant test kits according to the work area.		

The problems that occur in the evaluation of learning automotive subjects in Vocational Schools are the incompatibility of test equipment with the expected competencies in the work area, so it is proposed to make performance tests relevant to the automotive work area.

2) Design phase: The design phase of the automotive vocational dichotomy scoring performance test for competency tests for vocational students is made in accordance with the basic problems at the analysis stage. At this stage the grid of performance test instruments is arranged. The grid format consists of core competency columns, basic competencies, subject matter, indicators, task numbers or work.

3) Development phase: In the development stage, the validity of the performance test is carried out and the final stage is a reflection of product design. Validation aims to determine the extent of accuracy and accuracy of a measuring instrument in performing its measuring function. In this study the validity used is content validity. After the design stage of the performance test, the test instruments and rubrics that have been made are submitted to the expert team (rater judgment) to be analyzed theoretically, so that the validity of the test instruments is arranged. The content validity test is carried out by an expert team of 10 people.

Validity test was analyzed using Content Validity Ratio (CVR) and Content Validity Index (CVI).

The CVR formula is Lawshe in Primardiana, et al. [7]:

$$CVR = (n_e - N/2) / (N/2)$$

Mean: n_e = number of validators who agree.
N = total number of validators.

Calculation of CVR values can be exemplified in the analysis of performance tests, for example:

N_e = the validator = 9
N = total number of validators = 10

Value CVR $= \frac{ne - N/2}{N/2} = \frac{9 - 10/2}{10/2} = \frac{9-5}{5} = 0,80$ (Valid) because the validator is 10 people, the minimum CVR = 0.62. Thus the CVR counts 0.82> CVR min 0.62 (valid).

The test of the content validity of the performance test was carried out by 10 experts consisting of seven automotive vocational teachers and three workshop / industrial technicians, equipped with test items comprehension test by 10 students. The test results were analyzed using Content Validity Ratio (CVR). The following are the test results of the performance test item.

TABLE II. VALIDITY OF PERFORMANCE TEST CONTENT

Test content validity	criteria	Number of items	CVR > 0,62 (number of item)	Information: % valid content
Expert Judgment	Important	115	98	84%
	Not Important		17	16%

CVR table (n = 10) = 0.62

Based on the results of the research through expert judgment, it was obtained that 84% of the items were considered important and 16% of the items were considered not important.

4) Implementation phase: Performance test instruments that meet validation requirements are rearranged, while invalid ones are discarded. Product performance tests in the form of calibrated dichotomies have been tested in schools to determine the effectiveness of performance tests as competency-based testing instruments.

5) Evaluation phase: Evaluation of the performance test tool is a reflection activity on the development of a validated performance test, to determine the understanding of the test material carried out the readability test to the test participants (sample = 10 students).

Performance assessment uses competent-incompetent dichotomy scores. Students do work according to the worksheet that has been prepared. Assessors assess according to validated performance tests.

TABLE III. VALIDITY OF PERFORMANCE TEST CONTENTS

test content validity	criteria	number of items	CVR > 0,62 (number of items)	Information: % valid content
Test text comprehension (legibility)	Understand	115	80	70%
	Not Understand		35	30%

CVR table (n = 10) = 0.62

Based on the results of the study obtained an understanding test (readability of text / work assignments) that is understood as much as 70% and not understood = 30%.

The final stage of the research is the preparation of performance tests in the form of dichotomies that have validation. The following is an example of a performance assessment in the form of a dichotomy. The competencies expected by the test participants are the competence to dismantle and install inner and outer tires. In the competence to dismantle and install inner and outer tires there are several sub-jobs, which in the school are interpreted as competencies, namely: (1) work to dismantle inner and outer tires; (2) work on installing inner and outer tires.

TABLE IV. PERFORMANCE TEST/DICHOTOMY FORM PERFORMANCE
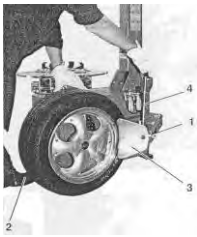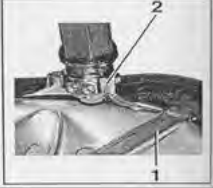
Name of examinee: …………………………… Test number : ………………………………				
Directions: Write a check (V) for the test participant's ability observed during the performance test.				
SKILL TEST MATERIAL: Dismantling, Installing inner and outer tires SUB COMPETENCE: Dismantling				
Purpose: Able to work / dismantle inner and outer tires				
NO	INDICATOR	VISUALIZATION OF PERFORMANCE OF CAREER STANDARDS	SCORING	
			YES (1)	NO (0)
	1. WORK PLAN 1. Preparation of work tools a. Tire Release Machine (Tire changer) b. Tyre Lever c. Shoap d. Tyre ring 13" e. inner tube ring 13" f. Velg ring 13" g. Paselin h. Fabric	a. b. c. d. e. f. g. h.		

Table 4. Cont.

	B. WORKING PROCESS 1. Install the tire on the side of the machine. 2. Position the pressure bar 3. By sliding the handle 4. on the side of the tire within 5 mm of the rim			
	C. RESULTS / WORK PRODUCTS 1. The tire has come off Rim well. 2. Work according to time set (faster than 30 minutes or on time 30 minutes)			

B. Discussion

This study aims to create a performance test instrument that is used as a reference in providing an authentic assessment of the field of tire patch expertise in automotive competence to students in Vocational High Schools. The validity of this performance test instrument has been validated by 10 experts in the automotive field. Based on the data from the validity test results through CVR and CVI that 84% of the items are valid.

The results showed that the readability test of the performance test had a low level of readability, because there were still many languages and the wording or vocabulary were not standardized. After the instrument has been repaired, the percentage value of readability increases to 70%, thus it is quite good because it is included in the "High" category.

At the stage of development of performance test kits. The results of expert judgment test produce items that are considered important are 98 items (84%) and 17 items that are considered not important (16%).

V. CONCLUSION

The research conclusions are: (1) 80% of the performance test items have content validity requirements; (2) performance assessment in the form of dichotomous scoring can be used to match the compatibility between theory and skills in practice in schools with the world of work; (3) the teacher can perform remediation on students in certain competencies that have not been mastered by students.

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