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Development of Performance Assessment Telecommunications Expertise based on KKNI to Support Vocational Competencies Achievement

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***Abstract*—Massive technology advancement shifts industrial demand in Indonesia from quantitative to qualitative demands, particularly in the field of telecommunication expertise. This Issue did not balance with the enhancement of learning instruction and assessment to support students in order to achieve the needed vocational competencies. Based on findings at preliminary study stage, it is known that some vocational teacher still uses cognitive assessment to assess psychomotor competencies. In some case, teachers are reluctant to change content of learning although competencies provided by that instruction no longer needed by today's industry. We believe those are one of the causes of high unemployment rate of telecommunication expertise graduate. This study aims to develop performance assessment based on KKNI to support the vocational competence achievement of telecommunication expertise graduate. Product development is done by Research & Development method with Sukmadinata procedure scheme. Product expected to support competency achievement in accordance with assessment standards and improve the relevance of vocational education to industrial needs. At this point, we currently at limited trial stage. As expected, we got good response from teacher for ease of use and accuracy of our developed product, also most of the students manage to achieve the learning outcome.**

Keywords—performance assessment; vocational competencies; KKNI; telecommunication expertise

I. INTRODUCTION

Definition of vocational education based on UUSPN No. 20, in 2003, article 13, is a secondary education that prepares participants to learn, especially to work in certain fields. This definition implies that vocational education as an educational program to prepare graduates enter the workforce. At present the proportion of vocational education is being opened up for promotion and opportunities by the government on a large scale. This is understandable because if the aim of vocational education is achieved, it will certainly produce labor at a young age and in the long run can help in alleviating poverty. In order to achieve this goal, vocational schools as vocational education institutions must be able to anticipate and adapt to various changes in labor market needs that continue to change over time as technology develops. Vocational education can be said to be successful if graduates are absorbed by the labor market or can entrepreneurship according to their skills.

Unfortunately, objectives of vocational education to have not been fulfilled. BPS surveys show most of the unemployed worker are vocational graduate. These problems indicate the low level of industry satisfaction for vocational graduate. The low level of satisfaction can be caused by many things, one of the cause is the existence of a competency gap between the competencies needed by the workforce and the competencies possessed by SMK graduates

In education, competencies are obtained by students through learning experiences in a learning process, then in order to ensure that students have the competencies that are expected to need educational assessment activities [1]. Based on preliminary studies, researchers found facts that could lead to competency gaps, among others, vocational school teachers had difficulty adjusting 2013 SMK curriculum materials with current workplace needs and assessment instruments used were only tasks and cognitive tests.

Competencies given in Vocational Schools should refer to the standard of occupational competency criteria. Job competencies expected from a SMK graduate can be identified with KKNI approach. KKNI is a qualification parameter of education graduates in Indonesia as an effort to equalize quality so that Indonesian HR can compete with foreign resources in order to anticipate the implementation of the ASEAN Economic Community policy. Vocational education in KKNI approach is at the level II qualification level with the proportion of competencies dominated by psychomotor and affective abilities, while the expected occupational competence competencies are technical competence and supervision competence. Thus, the assessment instruments used in teaching and learning activities in Vocational Schools must be able to assess student performance based on expected technical and supervision competency criteria. We believe the most appropriate instrument is a performance assessment.

Performance assessment is a form of assessment to demonstrate or apply the abilities, skills and knowledge even attitudes that have been obtained by students in the form of performance or products. Performance assessment has advantages in assessing learning outcomes that are better than assessment with tests with an understanding that performance assessment is a closer assessment of the reality of learning abilities. Performance assessment provides more information about the ability of students in the process and products, not just getting information about the right or wrong answers. Performance assessment consists of three basic activities, namely the teacher giving assignments, students showing their performance, then being assessed based on certain indicators with instruments called rubrics. The initial step in making a performance assessment must first identify aspects that will affect the final results first and then develop some specific behaviors from the competency criteria that will be measured with a certain scale. The assessment component that will be used refers to the 2013 curriculum, learning outcomes of KKNI and elements of SKKNI competency.

Technological advancement that we take as an example is the configuration of the internet network. The use of the internet in various aspects of life has influenced various changes in society, including the industrial world. Current technological developments in the field of internet communication speed are optimizing the configuration of computer networks on routers using microTik, therefore the company is in desperate need of a competent workforce in configuring microTik. The ability to configure microTik is in the description of the Map of the Computer Network Competency Unit and the Administration System of the SKKNI.

II. METHOD

The purpose of the study was to produce a product based on KKNI micro-configuration configuration expertise assessment performance. The product consists of the design of the implementation of learning, teaching materials, job sheets, instructions, assessment sheets, assessment criteria, calculation of practice values, and practical value qualifications. In accordance with the nature and purpose of the study, the research method uses the Research and Development (R & D) method with procedure scheme based on modification by Sukmadinata for the preparation of theses, namely preliminary studies, limited trials, and wider trials [2].

In the preliminary study using descriptive methods to collect data about existing conditions. In the trial phase, the product is used by more than one assessor to assess the same subject. The trial phase uses an experimental method with One Group Pretest-Posttest Design. The process and test results are evaluated using evaluative methods to improve the product.

III. RESULTS AND DISCUSSION

A. Product Design

Product design is carried out based on literature review, field survey, analysis of relevant research results, and consultation with experts so that a performance assessment grid will be formulated. Product early version consist of 5 parts, namely instructions, assessment sheets, assessment criteria, calculation of practice values, and score qualifications. The assessment sheet section is compiled based on the grid then adjusted to the practical test assessment component, namely work preparation, work process, timeliness, work results, and work attitude.

The work preparation assessment component is outlined in 3 indicators, namely network equipment identification, network equipment installation, and client PC configuration. The three indicators are compiled based on core competency analysis 3.6 and 4.6 a summary of network addressing protocols is complemented by an analysis of SKKNI TCP/IP component elements regarding the configuration of Internet Protocol.

The work process assessment component is compiled based on an analysis of SKKNI Static Routing competency elements which are translated into preparing the router and configuring the router. While the time assessment component serves to measure the ability of students to follow and solve problems faced when carrying out work processes in accordance with the specified time limit. Furthermore, the work assessment component is compiled based on an analysis of the SKKNI Static Routing competency elements which is translated into testing routers that demonstrate students' ability to verify network equipment connections.

The component of work attitude assessment is translated into religious obedience, work safety, work regulations, cooperation, and desire for achievement. Religious obedience is guided by the KI 1 indicator, which describes human relations with their god. Whereas occupational safety and work rules are based on CP level 2 KKNI regarding student compliance with work procedures, but also as an indicator of students' scientific behavior regarding discipline and responsibility based on KI 2 curriculum while the cooperation and desire for achievement are based on key competencies of SKKNI respectively.

B. Product Validation

The product is validated by 3 validators with different expertise, namely assessment experts, microtic experts, and telecommunications experts. Following figure are results of the data processing sheet expert validator:

No	Description	Score			$\bar{X}$
		V1	V2	V3	
Instruction					
1	Instructions for the assessment sheet are clearly stated	3	3	4	3.16
2	Assessment criteria are clearly stated	3	3	3	
Content					
3	Aspects are considered clear	3	3	3	3.66
4	The rubric is stated clearly	4	4	4	
5	Complete assessment tool	4	4	4	
Languange					
6	In accordance with language rules	3	3	3	2.77
7	Communicative statements	3	3	3	
8	Easy to understand	2	3	2	
$\bar{X}$		3.12	3.25	3.25	
$\bar{X}$ **Total**		**3.20**			

Fig. 1. Expert validation sheet.

The mean value for the description aspects of the instructions is 3.16, the aspect of the description is 3.66, and the aspect of the description is 2.77. The mean value obtained from V1 is 3.12, V2 3.25, and V3 is 3.25. While the total mean value obtained is 3.20. The value is then interpreted according to the guidelines of expert validation interpretation, it can be concluded that the instrument can be used with a little revision. Revisions are carried out on aspects of guidance and language descriptions, while aspects of material description can be used without revision.

The next step is an in-depth interview with each validator so that researchers better understand the opinions of these experts on developed product. Product ver.1 revision was carried out in order to produce product ver.2 based on expert's opinion. Figure 2 are summary of recommendations of each validator:

Validator	Recommendations Summary
V1, V2, V3	Assessment sheet and assessment criteria
V1, V3	Instructions, language, indicators of work preparation, and jobsheet
V1	Indicators of discipline, responsibility, and desire for achievement
V2	Technical configuration, connection verification
V3	Systematic indicators of work, facilities for network equipment

Fig. 2. Interview summary.

Each validator suggests revisions in the instructions section, assessment sheet and assessment criteria especially regarding further elaboration of some assessment components. Revise the instructions section by changing a number of sequences and adding usage instructions for the practical calculation and qualification value section. Revision in the assessment criteria section with the technical changes in practicum implementation which originally used 2 routers into 1 router. This improvement reduces the need for network equipment needed. Revision of the language used by reducing instruction with technical terms so that it is more easily understood by teachers and students.

Furthermore, the revised products were tested on 9 X class students in the TKJ program in vocational practicum activities. Student performance in practicum activities was assessed by researchers as rater 1 and 1 TKJ teacher from the relevant research location as rater 2. The limited testing phase aimed to examine the level of validity of assessment components and the level of inter-rater reliability from product version 2. seen in figure 3:

No	Component	r_{xy}	t_{hitung}	Validity
1	Preparation	.779	3,28	Valid
2	Process	.738	2.90	Valid
3	Time	.885	5.04	Valid
4	Result	.842	4.14	Valid
5	Attitude	.740	2.91	Valid

Fig. 3. Product ver. 2 validity.

IV. Conclusion

We are currently at the reliability testing process in limited trial phase. Limited trial phase aims to examine the level of validity of inter-rater assessment and reliability components from stage 2 performance assessment. In addition, this phase also aims to get further information about students' understanding of job sheet and rater's response. The inter-rater reliability test results are shown in figure 4:

Single Measures	.636[b]
Average Measures	.778

Fig. 4. Product ver.2 ICC correlation value.

The value of the Cohen's kappa coefficient obtained is obtained at 0.636, this value is smaller than kmn 0.800, so it can be concluded that the product has not met reliability requirements. From the ICC test per indicator there are several indicators with coefficient values under the minimum criteria, namely network equipment preparation, religious obedience, discipline, and desire for achievement. Indicators of network equipment preparation are included in the work preparation assessment component, while 3 other indicators are included in work attitude assessment component. We analyze cause of the problems are (1) Differences in perceptions for criteria "tools carefully and carefully prepared" on network equipment installation. These criteria are applied only at the work preparation stage. Most raters perceive these criteria applies for each student's activities that use the equipment during the practicum, (2) Criteria of religious obedience scoring are very dependent on the sense of hearing raters. (3) Giving scores on disciplinary criteria is very dependent on rater's ability to

remember every work regulation that has been obeyed or violated by students, (4) Job sheet deemed as incomplete so that it affects the score on the indicator of achievement. Some technical problems experienced by students during practicum activities have no solution in the job sheet, so students often ask the teacher and this is interpreted as a request for help to solve problems by Rater.

Furthermore, we conducted several revisions for product ver.2. We certainly hope this revisions ca overcome the weak level of inter-rater consistency on several indicators. The revised actions include (1) Criteria for "tools carefully and carefully prepared" are changed to "tools used carefully and carefully in accordance with procedures" and entered into work rules that are assessed through disciplinary indicators on the components of work attitude assessment, (2) Modifications to the work attitude rubric for religious obedience indicators can be in the form of students' speech or gestures, (3) In the discipline criteria rubric, a list of work rules must be followed by students to make it easier for Rater. (4) Job sheet improvements by adding detailed problem-solving solutions and optional "network troubleshooting" activities.

The revised product is expected to meet the reliability requirements so that it is ready to be tested with a larger number of samples and rater in the wider testing phase.

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