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The Cluster-Based Skills Passport Assessment Model to Improve the Effectiveness of Electrical Power Installation Competency Certification in Indonesian Vocational School

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Abstract

The study aims to invent an effective model of cluster-based skills passport assessment (c-SPAM). The c-SPAM needed to improve the effectiveness of achieving level II national qualification framework certification in Indonesian vocational high schools (SMK). Data was collected using the instrument validated by experts via the Delphi technique. The c-SPAM would be more effectively applied as a cluster competency test in SMK if 1) Professional certification bodies (LSP) implement c-SPAM gradually from the end of grade 10, 2) Competent students in several competency units or clusters need to be recapitulated into a logbook or skills passport, 3) skills passport of student need to be completed by attachments the certificates of competency and cluster. All aspects of c-SPAM are validated with a significant number between 0.76 – 0.96 (above 0.75) and the Aiken index having an average of 0.87. Therefore, the graduates of SMK will get a skills passport, competency certificate, cluster certificate, qualification certificate, and diploma.

Keywords: *skills passport, assessment, electrical installation, competency, vocational, certification*

1. Introduction

The graduate of vocational school aims to educate students to be skilled and ready to work, including to strengthen the national economy [1]-[2]. Vocational education and training programs must be attending the principles: 1) vocational education and training must be part of a comprehensive education system, 2) vocational education and training curriculum must refer to competencies required by industry, 3) students must be prepared to be able to work and be ready to fill vacancies at companies and industries (DUDI) [3]. The majority of Indonesian vocational high school (SMK) graduates are not yet competent as prospective workers are needed by DUDI. Even the mismatch between supply and demand still remains a contemporary issue of vocational education in Indonesia. The absorption of SMK graduates by every DUDI is still low and decreasing [4].

The number of unemployed people who came from SMK graduates has increased from 7.2% in 2014 to 9.84% in 2016 [5]. The study of access mapping conducted by Learning Curve-Pearson shows that the quality of Indonesia's education is the last ranking of the 40 countries [6]. The issue of inequality and the problem of the mismatched supply of graduates with labour demand still the cause of the slow increase in quality, efficiency, and competitiveness of vocational education [7]. Whereas in the course of their work, SMK has provided many specific expertise competencies to their students [8]. The expertise is obtained by vocational students in each semester through productive subjects. How to follow up its?

In the eighth part of the book "Skills Towards 2020 for the Global Era" describes an outline of the quality improvement program for vocational education. One of the proposals presented was to design a skills passport to give workers and prospective workers a list of the skills they have achieved [9]-[10]. The process flow for achieving the

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competency certificate proposed in 1997 is explained in the following Figure 1. The proposal was stopped along with the change of government at the end of 1998. Many competency certification test models are applied at SMK [11]-[13], but all of these models have not applied the concept of skills passport [14]-[15].

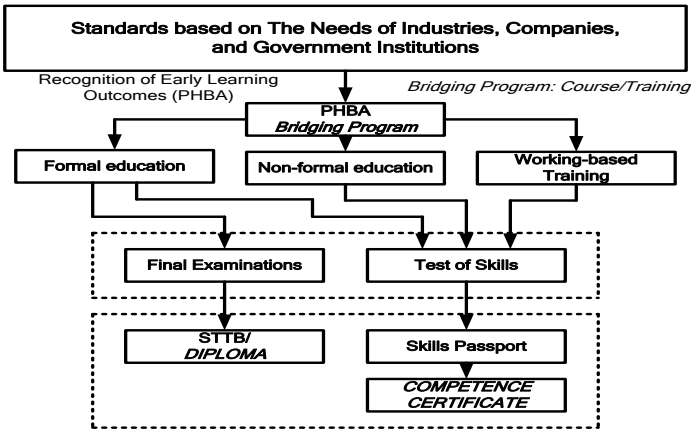

Figure 1. The Last Process Flow to Achieve a Competency Certificate [16]

Currently, the government and educational institutions have the idea to re-apply the concept of skills passport. Skills Passport is a record of the skills a person has acquired through training, education and work experience [17]-[18]. Skills passport are closely related to skills and career frameworks include qualifications, training and experience related to promotion, etc. [17], [19]. Skills Passport is a model of the achievement of skills by someone who has been tested through an examination or certification process in a particular field or sector. Passport skills allow one owner to meet sector needs to support both individual careers and the development of an organization's workforce. Skills passport possessed by someone is useful for personal career development tools to help track the skills they have mastered [20].

The implementation effort of these ideas and concepts are followed by the issuance of Presidential Instruction (Inpres) No. 9 of 2016 concerning Vocational Revitalization [21]. All stakeholders are encouraged to carry out vocational revitalization programs. All parties are asked to make efforts to improve the quality of SMK. These efforts are carried out starting from the preparation of the curriculum, the learning process, assessment, and evaluation. All steps are based on industry competence.

The national professional certification body (BNSP) was asked to accelerate the process of competency certification for SMK graduates and accelerate licensing for SMKs as a first-party professional certification body (LSP-P1). BNSP issued regulation No. 1 of 2017 concerning the implementation of competency certification for SMK. Its contains guidelines for implementing competency certification for SMK. The guideline establishes a certification scheme for SMK graduates, assessment planning and development of its equipment, the implementation of assessment and gradually competency test in the form of a skills passport. The problem i.e.: 1) How does the LSP implement c-SPAM in stages? 2) How to recapitulate the competencies achieved by students? 3) What extent are passport skills required by students? 4) How is the legality of ownership of passports and skills recognized by the industry? 5) How to integrated model of skills passport assessment to enhance the student competency on the process of cluster certification test?

2. Methodology

The research began with a preliminary study to obtain data on the implementation patterns of competency tests in Indonesian vocational high schools. The research

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approach uses quantitative descriptive methods. Data analysis and results presented quantitatively and descriptively. The pattern of competency test assessment is formed into an integrated model to be validated by experts through the Delphi technique [22]. The expert validates some aspects in c-SPAM i.e. supporting theories, implementation procedures, comprehensive principles, continuity principles, and management of assessment results. The process of research validation was conducted by academia, practitioners, productive teachers, and management of professional certificate boards, LSP. The validation results are used in the process of building a skills passport assessment model. This model can be implemented every LSP in the competency test process.

Table 1. Human Resources and Data Collection Technique

Validated Aspects	Data Retrieval Techniques	Instrument	Informan/Validator
1) Supporting theories 2) Implementation procedures 3) Basic requirements 4) Pre-assessment 5) Assessment process 6) Reporting process 7) Comprehensive principles 8) Continuity principles 9) Management of assessment results	1) Observation 2) Questionnaire 3) Interview 4) Documentation	1) Sheet validation 2) Questionnaire form 3) Interview form	1) Academia 2) Industry practitioners 3) productive teachers 4) management of professional certificate boards (LSP) in some vocational schools

Validators came from 2 universities, PT. Mitsubishi, PT. Omron, PT. Hexaef Indonesia, 10 LSP at SMK, Dir. PSMK.

3. Results and Discussion

BNSP Regulation No. 1 2017 provides guidance on the implementation of competency certification for vocational high school (SMK) graduates [23]. Guidelines for following up on presidential instruction no. 9 of 2016 concerning vocational revitalization [21]. The entire pattern of implementing competency certification that is currently in progress by Vocational Schools to be adjusted to the BNSP Guidelines no later than 1 year since the stipulation of regulations. But until now, the majority of SMKs' have not been able to implement them. Even SMKs that have conducted competency certification must still adjust the number of clusters with the time of implementation.

Vocational Management has not been able to implement a number of cluster certification programs in a time that is too close together. Therefore, BNSP determines the pattern of certification implementation, certification schemes, assessment planning, development of assessment tools, executing assessments, controlling competency certification activities and competency certificate logos [23]. BNSP in collaboration with the ministry of education and culture has established a level II national qualification framework certification scheme to streamline the implementation of certification in SMK. This scheme aims to ensure work competency level II KKN and reference in carrying out assessments by LSP and assessors in vocational schools. The scheme must be achieved using a cluster approach.

If one expertise program has several clusters and in one cluster consists of several competency units, then certification is very troublesome because it must be carried out simultaneously at the end of class XII teaching and learning activities. The Directorate of SMK Development regulates SMK as a network of first-party professional certification (LSP) institutions within the SMK environment [24]. This regulation aims to streamline the implementation of certification among vocational schools in adjacent areas.

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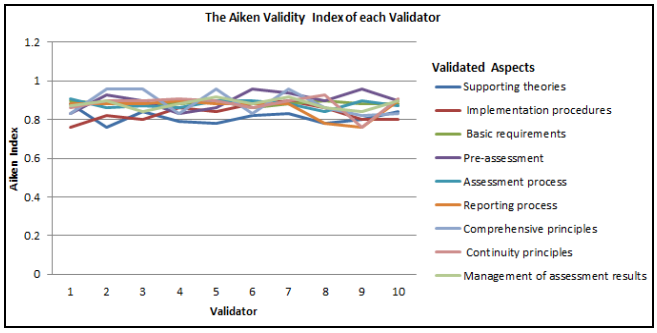

Figure 2. Chart of the Aiken Validity Index of Each Aspect, Between 0.76 - 0.96

What is the effective pattern and how will it be implemented? This will be explained in the results of this study. Referring to the Aiken's validity provisions [25], the validator has validated the five aspects of developing c-SPAM. 10 validators have validated the c-SPA model. The validation results show a number between 0.76 - 0.96 (Figure 2). Thus all aspects are validated significantly because the validation index is above 0.75 [26]. The validation process of c-SPAM carried out by the validator on several aspects that were validated. Aiken's index position on the nine aspects is illustrated more clearly in the following graph. The validator has validated the model of cluster-based skills passport (c-SPAM) with the Aiken index having an average of 0.87 (Figure 3).

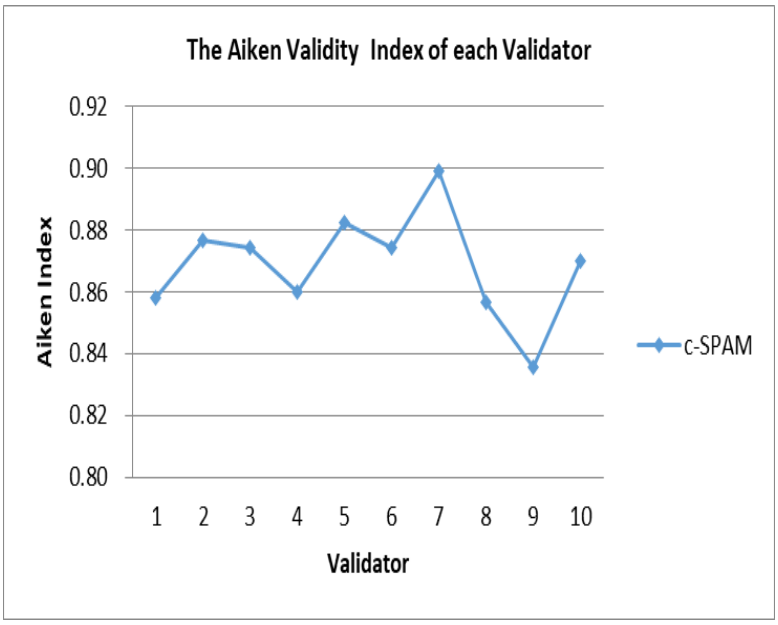

Figure 3. Chart of the Aiken Validity Index of c-SPAM from Each Validator

All aspects that were validated concluded that the cluster-based skills passport assessment model was effective to apply. In other words, the cluster-based skills passport assessment model to improve the effectiveness of achieving certification level national qualification framework II. The steps on how to apply c-SPAM in detail will be described referring to the next Figure 4.

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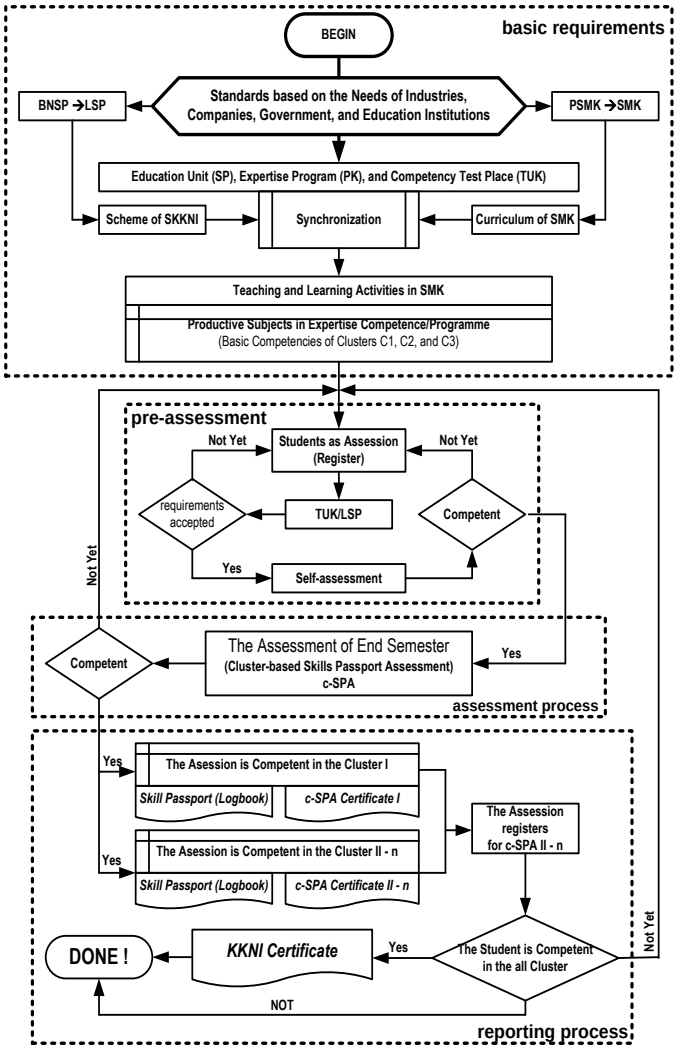

Figure 4. The Effective Model of Cluster-Based Skill Passport Assessment (c-SPA)

The Effective Model of Cluster-based Skill Passport Assessment (c-SPA) is grouped into 4 parts. The basic requirements give directions to SMK management to synchronize the SKKNI scheme with the curriculum. The results of synchronization must be implemented in teaching and learning activities in vocational high schools. Each group (C1, C2, and C3) productive subjects describe the competencies that must be achieved by students.

At the end of the semester, students register as cluster certification test participants. After the registration file is received, they must fill out a self-assessment form to measure competence/not on all aspects of the question. Students who are declared competent in the entire pre-assessment process will proceed to the assessment process step. At this stage, students register via the online system (for example: via Google form) and attach the required file requirements [27].

At this stage, students can choose which clusters will be assessed. Students register the cluster that is tested according to the competency scheme that was completed in the semester. LSP manages the implementation of this assessment process. The results of the assessment at this stage will be recorded in the logbook or skills passport. If students are declared competent in all competency units in the cluster being tested, then the LSP has the right to provide the competency certificate for the cluster. LSP limits the validity period of this competency certificate to a maximum of 2 years. The use of digital technology can guarantee the validity of the logbook and cluster competency certificates.

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The pre-assessment step and assessment process will continue repeatedly until all cluster tests are followed by students. Furthermore, the Assessor together with the LSP made a report on the results of the competency certification test assessment. At this stage, the test participants prepare a valid log book and cluster competency certificate. LSP will provide a Level II KKNI certificate issued by BNSP to participants who are declared competent in all clusters in their expertise program. This certificate is bearing the Garuda bird. LSP will only provide certificates bearing the LSP logo with BNSP permission to students who have passed part of the cluster. BNSP limits the validity period of this competency certificate to a maximum of 3 years. The use of digital technology can guarantee the validity of a certificate. Therefore, the Effective Model of Cluster-based Skill Passport Assessment (c-SPA) that can be carried out with effective steps is described in following Figure 4.

The results of the c-SPA model validation have been rearranged so that it becomes more effective. The effective model of cluster-based skills passport assessment (c-SPA) begins by setting the competency standards of vocational graduates' skills required by industry, companies, government, and educational institutions. Vocational Management consisting of school principals, heads of expertise programs, and competency test teams must synchronize the schemes in the SKKNI to become subjects included in the SMK curriculum. The results of synchronization must be an integrated part of teaching and learning activities in SMK.

In the electricity expertise program, the competency of electric power installation engineering expertise is 4 clusters of 26 competency units [28]. Vocational Schools in collaboration with the LSP can divide 3 periods of competency certification test implementation. The certification process starts from the end of class 10, the end of the semester I and II in class XI, and the end of the odd semester in class XII. Achievement of competencies by each student in each cluster can be recorded into the passport of skills. Every student who is declared competent in each cluster is appreciated with a competency certificate. This certificate is issued by the LSP at the Vocational School. While students who are declared competent in all clusters will get a Level II KKNI certificate bearing the Garuda logo issued by BNSP.

4. Conclusion

The skill passport assessment model of Indonesian vocational student must be implemented starting in grade 10. The application of c-SPAM from grade 10 will have a positive impact, i.e.: 1) the implementation will be effective, 2) the financing is economical, 3) the validity period is valid, 4) the validity is guaranteed, and 5) easy to use. For some items, this model is easy to implement if assisted with the use of digital devices.

c-SPAM would be more effectively applied as a cluster competency test in Indonesian vocational schools if 1) Professional certification bodies (LSP) implement c-SPAM gradually from the end of grade 10, 2) Competent students in several competency units or clusters need to be recapitulated into a logbook or passport of skills, 3) Students passport of skill need to be completed by attachments the certificates of competency and cluster, 4) Passports and competency certificates require legality and validity that can be detected by all users anytime and anywhere. the graduates of SMK will get a skills passport, competency certificate, cluster certificate, qualification certificate, and diploma.

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