

## **Development of Dacum as Identification Technique on Job Competence Based-Curriculum in High Vocational Education**

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**Abstract:** *The purpose of this study was to identify the job competency in the field of electricity that was taught in Vocational School (SMK). This research used research and development method. Based on conceptual and procedures, this research and development was carried out referring to the model of SCID. It was summarized in four stages: initial assessment, design, realization and evaluation. The development procedure started with a need analysis of the competence of electricity in workforce and evaluated in several schools to get a response about their learning needs. These results were then validated conceptually by experts. It showed that the job competence profiles that were developed by Dacum identification technique were valid and reliable to be used because it was practical and effective.*

**Keywords:** *Dacum, Competence Based, High Vocational Education*

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### **I. Introduction**

In Indonesia, Education development plan has been realized in the long-term development plan for 2005-2025 which launched the construction of complete Indonesian man . It has vision to produce an individual who is intelligent and competitive. Through the development of education that focuses on: (1) equity and expanding access to education; (2) improving the quality, relevance and competitiveness of education; (3) strengthening government management, accountability and public image [1].

Furthermore, it has also affirmed in explanation of Article 15 and 18 of National Law about Education System Number 20 Year 2003 specifically concerning about vocational secondary education. The vocational secondary education has vision to prepare students primarily for independent living and become middle-level workers in accordance with the competence and expertise that they have chosen.

Specifically, the purpose of education in vocational schools (Sekolah Menengah Kejuruan - SMK) is to improve students' intelligence, knowledge, attitudes, and skills so that they can live independently. The aim is to give meaning that the task of vocational education is to prepare the human resources as a quality workforce, have the competence, able to adapt and compete even have the independence to open a business according to their field.

In connection with the preparation of human labor, the relevance of vocational secondary education in terms of their equivalence as the role of partnerships between education and the world of work, has been introduced by Wardiman Djoyonegoro since 1995 in the form of link and match [2]. It is also supported by Sukanto [3] who stated that the world of work is a reflection of the development in society which is very complex and dynamic and raises many specialties with the demands of an increasingly specific skills and higher qualifications.

In fact, a common problem in vocational education especially those in SMK that it is less able to see the existing needs of the workforce. It is also less responsive to changes in the surrounding environment, such as curriculum and learning systems. As results, many people still have opinion that many vocational graduates are still not competent in their field.

In line with these, various problems showed weakness in the vocational education system that adversely affects the competence of the students' expertise and the lack of implementation of the character values in the learning system. Several studies and surveys indicate this fact. The world of work only want to accept graduates who have work experience in their field. They have still not acknowledged the learning outcomes of Prakerin (industrial work practice) that seeded in vocational learning system.

Therefore, the problem in the development of national education is that it has not reached the aims as expected. Ministry of National Education, the operator of the education system has an obligation to realize the vision of development. Link and match between vocational education and the world of work is an effort that must be implemented. It means that the world of work must also take responsibility for improving the quality of vocational education in Indonesia. The government should make regulations in each area and participate in the policy and regulatory cooperation (MOU) between the vocational and the world of work.

The quality of education is closely associated with the implementation of learning that can be influenced by the curriculum, teaching staff, infrastructure, and other supports. Some experts argue that the

value of a curriculum is determined by its ability to provide education and encourage students to achieve the learning objectives.

The phenomenon of the development in competency curriculum 2006 (KBK – Kompetensi Berbasis Kurikulum; competence based-curriculum) and the curriculum 2013 for vocational learning system requires adjustment of competence that needed by the workforce and the integration of character value that students must have. Some of the factors that determine the content of the curriculum and vocational technology education are: (1) the demands of the government in central, provincial and district levels; (2) the required skills, (3) focus only on the vocational content; (4) the level of content that will be produced [4].

The concept of competency-based learning and valuable character clearly requires the formulation of competencies that must be owned by students after participating in learning activities. By referring to the achievement of competence in learning activities, students in learning will focus and avoid the study material that do not support the achievement of competencies.

To design a competency-based curriculum, according to Borich, Gary D [5], there are some characteristics of learning. They are: (a) a partnership with the world of work; (B) the student is treated as an employee; (C) the learning should be designed in accordance with what is needed in the workplace and what is required of students; (D) the starting point is the formulation of competencies and learning identification; (E) prepare the module to introduce strategies and learning techniques at appropriate work situation.

Finch & Crunkilton [4] explicitly stated that there are four models of curriculum design, namely; academic models, experiential models, pragmatic models, and technical models. He also explained that the technical design of the model is a model curriculum that can be applied to vocational education. Likewise, according Sukanto [3] there are some existing curriculum model that are often used: (1) The curriculum is centered on the subject; (2) The core curriculum; (3) The curriculum-based group; (4) competency-based curriculum; (5) an open curriculum.

Based on those expert opinions above and the different objective of program characteristics for each model curriculum, then there are some models that can be used in developing the content of the curriculum in vocational school. Finch and Crunkilton [4] offered four approaches which are philosophical approach, Dacum, function and Delphi.

Dacum (Developing a Curriculum) is a method of conceptual analysis process or job profile and position, which is used by educators and instructors. Development of curriculum content with Dacum approach is conducted through a technical assessment by skilled committee without involving teachers to identify all the competencies that are important to be owned by students at vocational schools. This process must be done in order to identify competencies that will be taught in school is not on the basis of the ability of teachers who will teach, but purely because the needs of the workforce.

## **II. Research Methods**

Computer is an electronic device that is complex and has many advantages. Computers can be used as a tool that reliable and accurate in a wide range of data processing because a computer is capable to process large amounts of data quickly and accurately.

The use of computers in a research is very practical and reliable. Therefore, in this research and development (R & D) to develop a product-oriented model of competency-based learning in vocational [7], it is used to identify the job competence profile that is done through Dacum techniques.

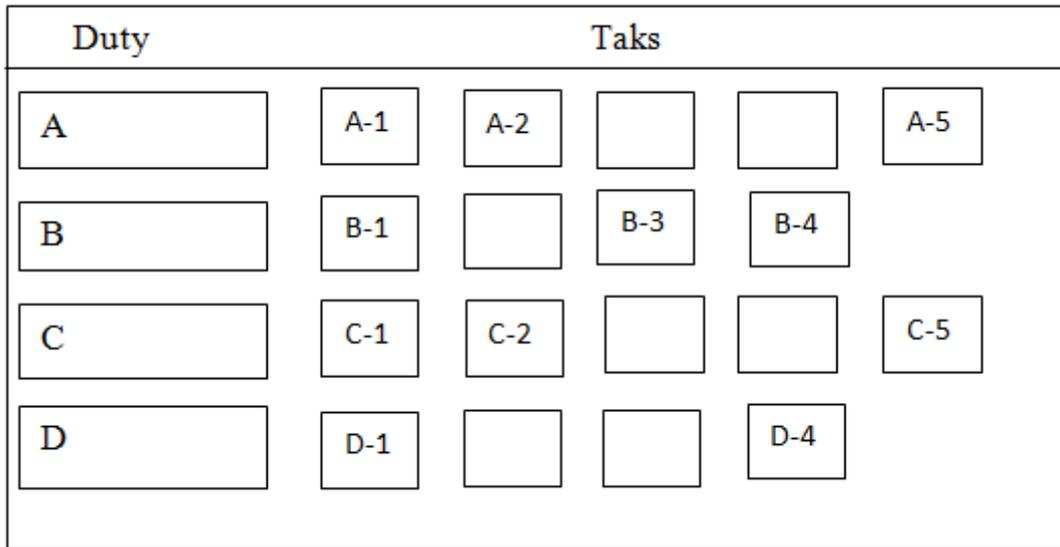
The uniqueness of the process of identifying the content of the curriculum with Dacum approach is the sequence and intensity of participation that should be targeted. It is expected to produce: (a) an inventory of basic competence or specific knowledge that is used as the content of the curriculum framework, and (2) the elements of competency in accordance with the real needs of the employment. It is the excess of approach involving the employers of the industry and the world of work.

Dacum continue to grow until now and is an analytical method for a particular field of work (small groups). Process analysis on Dacum uses experts (expert workers) of specific work as a source of information to determine labor experts: knowledge, skills, standards, tools and attitudes required for a particular job. Dacum process includes a panel of experts who work with a trained facilitator dacum for a few days to develop a research chart. Chart of research is in the form of a list of the representation of the obligation (duty) or job competencies.

Determining the content of the curriculum and vocational technology education through Dacum techniques is considered to be more objective in finding the material skills. Norton [8] and Finch [4] stated that the process is conducted through four stages namely: (1) reviewing a job description; (2) identify the skills for each competency; (3) develop skills based on the order of learning experiences; (4) establish the appropriate skill level of competence for each work situation.

The technique to prepare this competency profile is created in the corresponding table based on competency materials. The composition and sequence of blocks of work competence are discussed along with

some expert worker in assessing the competence that should be taught in the appropriate level of mastery in school, gradually starting from easy to more difficult levels. It can be seen in Figure 1 as follows;



**Figure 1,** Dacum Tools [7]

Through this technique, the element profiles and required competencies in completing a job were discovered. Competency profile becomes a planning competence for the job which would serve as guidelines in formulating standards of competence.

Assessment techniques and analysis in Figure 1 is still manual that is by writing on pieces of paper, taping in panel and discussing together with the members of the expert worker. These events will require considerable longer time and high cost. Therefore, it is necessary to involve computer in the procedure development.

In the development stages of job competency identification through Dacum technique, it is done with the help of a computer with a projector as a medium, It can display the elements of competency as recommended in open discussion with all members of expert workers as a source of information in the field of electrical work workshop.

The process which is assisted by computer is very practical in identifying job competence profile. The use of competence blocks which is modified in tabular form is arranged based on appropriate level of mastery, gradually starting from easy to more difficult levels. In the end of process, the results are the job competence profile in the field of electricity which will be used to design competence-based learning instructional in the field of electrical engineering.

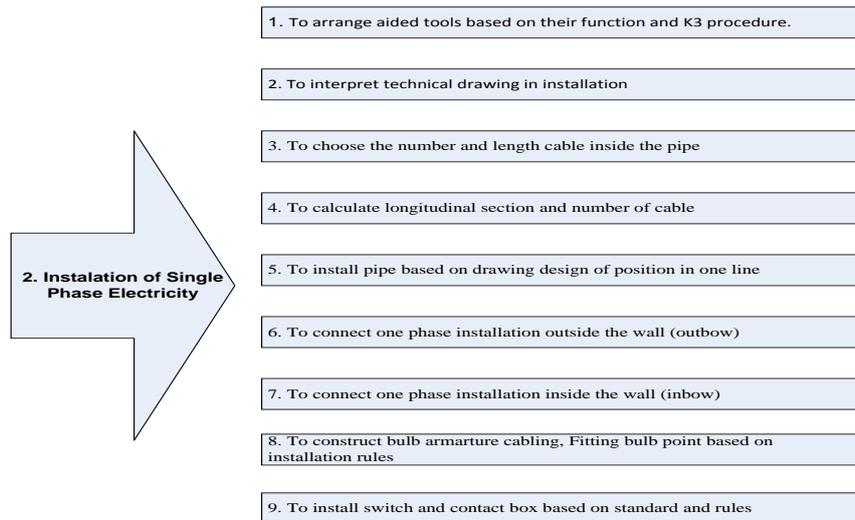
### III. Research Results

The first stage of the research is to collect and evaluate information competencies for electrical installation work. In the first stage, the core competencies were identified, which became the job competence profile. This profile is arranged in the order of work to be done in installing simple electrical installations in buildings, which belong to the class of low voltage, the electrical power of 450 VA to 197 kVA. The results can be seen in Table 1.

**Table 1.** Profile of Competence Installing Electrical Installation in Simple Building

No	Basic Competence
1	The implementation of Work Health and Security (K3 - Keselamatan dan Kesehatan Kerja)
2	Installation of one phase electricity
3	Installation of Low Voltage Main Distribution Board (LVMDB)
4	Installation of Grounding

The second stage is to discuss and identify the elements of competence starting from the easiest to the highest criteria of the performance criteria. The examples of identification techniques can be seen in Figure 2



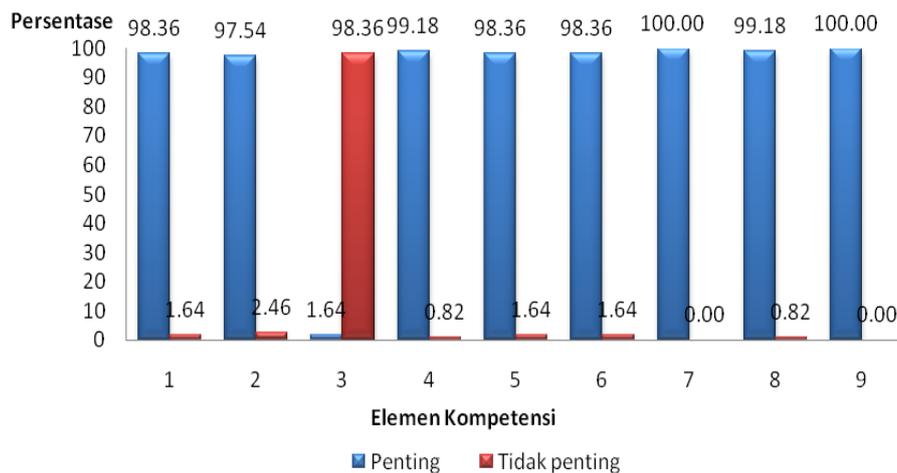
**Figure 2.** Instalation of Single Phase Electricity

Furthermore, the identification through Dacum technique, in Figure 2, is evaluated and compiled in Table 2 according to the level of work on each sequence competence. Examples in Table 2 below;

**Table 2** Basic Competencies of Instalation of Single Phase Electricity

No	The Element of Competency
1	To arrange aided tools based on their function and K3 procedure.
2	To interpret technical drawing in installation
3	To choose the number and length cable inside the pipe
4	To calculate longitudinal section and number of cable
5	To install pipe based on drawing design of position in one line
6	To connect one phase installation outside the wall (outbow)
7	To connect one phase installation inside the wall (inbow)
8	To construct bulb armature cabling, Fitting bulb point based on installation rules
9	To install switch and contact box based on standard and rules

The descriptive results of the questionnaire about responses to the identification of learning needs in schools, on the basis of competence single phase electrical installation, responded as the data illustrated in Figure 3.



**Figure 3.** The Percentage of The Elements of Competency Needs

#### IV. Conclusion

Based on the analysis of electrical competence needs through workshops, involving expert workers from specific electrical work, it can be concluded that computer-based competence identification products by

using Dacum technique are effective and practical to be used in the field of electrical installations in vocational secondary Schools (SMK).

It is proven from the results through the evaluation questionnaire to identify the needs of competency and learning in schools shows that one hundred twenty-two respondents have chosen 8 eight competency elements that are considered important in learning installing electrical installation in simple building.

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