ATLANTIS PRESS

Advances in Social Science, Education and Humanities Research, volume 102

1st International Conference on Technology and Vocational Teachers (ICTVT 2017)

Vocational High School Readiness In Facing The Asean Economic Community

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***Abstract*—This study aimed to reveal: 1) Vocational High School attempts in improving the competence of its graduates, 2) Vocational High School graduates distribution over the past three years, 3) Participation rates of Vocational High School graduates in labour fulfilment of Business and Industrial World (DUDI).This study used the Qualitative method with Case Study approach. Subjects of this study consisted of students, teachers, principals and the business as well as the industrial world. This research used data collection techniques of observation, questionnaires and documentation. This research was conducted at SMKN 2 Depok and SMK Muhammadiyah 3 Yogyakarta. Data were analyzed using Triangulation. The results of this research were: 1) Vocational High School attempts in improving competence of its graduates consisted of : curriculum formulation of productive subjects together with the Business and Industrial World, productive teacher workshop with the Business and Industrial World, link and match the materials and the instruments used in practice between Vocational High School and the Business and Industrial World, students internship / work practices of Vocational High School students in the Business and Industrial World for at least 4 months, and cooperation (MoU) between Vocational High School and the Business and Industrial World in terms of increasing competence and recruitment of vocational high school graduates; 2) Vocational High School graduates distribution over the past three years consisted of : 80,12 % worked in accordance with the competence and skills they have, 19,88 % worked in less related field to their competence and skills; 3) the Vocational High School graduate fulfillment in labor compliance of the Business and Industrial World during the last three years is 91,86 %.**

Keywords—competence, graduates, vocational high school

I. INTRODUCTION

Vocational High School (SMK) was one of the institutions to prepare qualified and competitive middle human resources. This was in line with the government's goal of trying to increase the number of middle-level human resources ratio in order to be ready for working in the era of Asean Economic Community (AEC), through vocational schools. In the perspective of Curriculum 2013, Indonesian Government wants to prepare productive, creative and innovative human resources. At present, however, not all SMK were ready to implement the curriculum.

According to Central Bureau of Statistics (BPS) in 2015, Indonesia currently has the largest population of ASEAN, by 248.8 million people. Indonesia as one of developing countries in Asia was quite attractive for developed countries in terms of its natural and human resources. Currently, with the enactment of AEC, Indonesia has a great opportunity to dominate the fulfilment of workers sector in and outside the country. On the contrary, if the Indonesian government cannot prepare qualified human resources in accordance with the needs of the industrial world, it will be one of the burdens of the state.

Central Bureau of Statistics (BPS) in 2015 explained that percentage of unemployed graduates of SMK in 2015 has increased by 5.578% compared to the number of unemployed graduates of SMK in 2014 by 1.258 million to 1.332 million people. The number of registered vacancies in BPS 2015 was only 612,699 units, the statement was confirmed by the Director of SMK Mustaghfirin, that the percentage of unemployment rate among SMK graduates in August of 2015 was the highest at 11.24%. The same statement was conveyed by the Head of SMA/SMK Department of Education and Culture of Yogyakarta in Republika 2015, only about 1,464 SMK graduates in 2015 were absorbed in employment from a total of 4549 graduate students. It can be shown that almost one-third of SMK graduates will be the burden of the state if they were not absorbed in Business and Industrial World (DUDI).

Based on the phenomenon, a real effort was necessary to optimize SMK graduates to be absorbed in the world of work. Therefore, a preliminary study of vocational school' readiness was required to improve the competence of its graduates to deal with AEC. Through this study, the government was expected to know any constraints experienced by SMK in terms of increasing competence of graduates to face the AEC. In addition, some vocational schools that have successfully increased the competence of its graduates that they can survive in the era of AEC were expected to be a model for other SMK.

Thompson [1] argued that vocation/vocational education was an education designed to develop the skills, competence, understanding, attitudes, work habits, and appreciation needed by workers to enter and make progress or achievement at their work. To obtain qualified and competitive middle-level human resources, it was necessary to be supported by a national education and training system developed based on the needs of the labour market and the dynamics of accelerated changes occurred in the business and the industrial world. In an effort to respond to the needs and challenges of today's global world and to cover all aspects of life and adapt to global changes and the

development of science and technology, the new Law on National Education System has been passed in lieu of Law No. 2 of 1989. Vocational High School (SMK) as part of the National Education System wanted to prepare learners primarily to work in certain areas and expertise. Vocational High School was also directed to be the front guard in facing global challenges. The development of SMK education quality in the globalization era was now oriented to the improvement of excellence and competition that include the education system on the improvement of the training by referring to the competency standard that must be owned by SMK graduates.

Philosophically Vocational education had objectives to prepare an individual for work. Thompson [1] argued that vocation/vocational education was an education designed to develop the skills, competence, understanding, attitudes, work habits, and appreciation needed by workers to enter and make progress or achievement at work. The development of vocational education in the 21st century today should pay attention to future job demands (what job needed) and what competencies were appropriate to the job's demands (what was needed to do the job). Piirto [2] argued education in the 21st century cannot be separated from the way of creative thinking in a person. Based on these demands, vocational education in the current AEC era should be able to improve individual competence and productivity at work so that it can compete with other countries.

Based on some opinions above, it can be concluded that vocational education was designed to prepare individuals for the development of skills, the acquisition of life skills, understanding of work competence, and the formation of work attitude to prepare for entering the workforce according to the demands and progress of the era. Life in the twenty-first century required a fundamental change in the middle to high-level of education. The forms of such changes to be carried out, including: (1) change from the life viewpoint of the local community to the global community, (2) the change from social cohesion to democratic participation (mainly in the education and practice of citizenship), and (3) change from economic growth to the development of humanity.

Piirto [2] explained that to implement the three major changes in middle to higher level education, the five basic bases used as a pillar of education consisting of: (1) learning to know, (2) learning to do meant that the mastery was focused more on the competency than the skill acquisition by classification of ISCE (International Standard Classification of Education) and ISCO (International Standard Classification of Occupation), dematerialization of work and ability to respond to the rise of service sector, and work in informal economy activities, (3) learning to live together, and (4) learning to be, and; (5) learning throughout life.

The curriculum formulated and developed by the vocational school should be in accordance with the existing needs in the field (business and the industrial world). Therefore there was a need for a correlation and appropriateness in the preparation of curriculum in Vocational School. In addition, competency achievement level of graduates should be evaluated annually by the school and the business world and industry, to maintain the competency achievement of graduates and provide any suggestions to the schools along with the dynamics of competence changes in the particular area of expertise.

Results of studies also confirmed the argument. For example, Boediono and McMahon [3] concluded that investment in education contributed greatly to economic development in Indonesia. The Directorate of Vocational School Development (2008) conducted a study on SMK expansion strategy which concluded that “In order for SMK expansion to be relevant to the needs of DUDI and related areas, the addition of students and vocational high schools was oriented to prioritize on areas of high absorptive expertise”. This finding was still the norm. Another study conducted by ADB in 2008 concluded that: “All countries were investing in technical and vocational education and training (TVET) in fact, correlations indicate that the higher level of country income, the higher proportion of students enrolled in TVET institutions”. However, vocational education held independently as an educational unit (SMK) was criticized for its low rate of return, arguing its high cost but low return value. Very few graduates applied their skills gained from vocational schools, even many of them were continuing to universities, many graduates work in irrelevant/not expertise areas, and many other graduates of vocational schools were unemployed (ADB, 2008). In order to align the vocational education to the needs of work/society, King & Palmer [4] argued that the 21st century required a reform on the function of vocational education. For Indonesia, their opinion was not new because in 1998 the Directorate of Vocational Education has been reforming with its concept called Skills Toward 2020 meaning that SMK must be based on demand driven (based on the needs of work with all variations of its kind). Skills Toward 2020 was also very in line with UNESCO's (1984) suggestion that vocational education was expected to rearrange the organization and its coordination with the world of work. Therefore, in the future, the development of vocational education was oriented to emphasize harmony with the needs of diverse communities. Due to the diverse needs of the community, vocational education must be able and capable of organizing diverse programs as well in order to support Indonesia's economic development [5].

Yahya [6] explained that the management of vocational schools, especially in cooperation with industry in the era of regional autonomy and decentralization was compulsory. A delegation of authority from the central government required local governments to manage the education sector, particularly vocational education. In fact, vocational education was often prepared to work hard in finding industry partners or partners in absorbing graduates because they were not supported by policies supporting the vocational education. Local governments still believe in private industry for absorbing vocational education graduates. One of the policies that can be executed to overcome this problem was to optimize the role of the Regional Owned Enterprises (BUMD) as an industry to absorb the graduates of vocational education and curriculum development through cooperation between vocational schools and industry in a sustainable manner.

Nitipong [7], results of his research explained that the curriculum was made based on the integration and the development of ability on the field of science. Curriculum

development in Thailand was a new program created to respond to industry challenges in entering the AEC 2015. The curriculum was developed based on an analysis of the strengths and weaknesses of the teaching and learning professions in various fields.

The AEC Framework and the implementation of the Asean Free Trade Agreement (AFTA) were also fundamental considerations for analyzing the specific labour requirements for Thailand in the future. The curriculum structure consists of three main points: an in-depth understanding of technology products and services; Accounting to prepare students with a strong financial understanding and to assess business; also learning English because it was the official language for communication in all communities in ASEAN [7]. Marie's results of research [8] explained that curriculum development in the Philippines (K-12) was a means of preparing students for better job opportunities at home or abroad. The K-12 program was also needed for the holistic development of 21st-century learners equipped with life skills so as to contribute to economic and social development. The K-12 program suggests the need for strict monitoring of program implementation and provision of ongoing professional training for teachers on appraisal systems, skills development for work standards, and the processing of learning activities to achieve target competencies and expertise. Furthermore, the K-12 Program recommended the provision and development of labour policy standards and educational opportunities in the integration of the ASEAN Economic Community.

Soeprijanto [9] from the results of his research was explained that The Government of the Republic of Indonesia has two policies in improving Vocational schools, namely: (1) increase the number of vocational schools to a ratio of 70:30 compared to the number of public secondary schools, and (2) add international vocational schools. Several performance indicators were developed to ensure the graduates quality of Vocational High School (SMKI). Indicators for teachers of ISMS were: (1) teachers facilitate basic learning of information and communication technology, (2) science teachers, maths and vocational subjects must be able to teach subjects with two languages, English and Indonesia, (3) the schools must have 20% -30% of teachers with Master or Doctorate degrees, whose study program was accredited A. The impact of the policy were: (1) teachers from various study programs, including those which were not yet opened by teacher training institutions (LPTK), were indispensable (2) Policies should be supported by teachers of international quality. For this reason, LPTK has undertaken several programs, namely: (1) developing new courses in line with increasing number of vocational schools, (2) developing regional alliances to prepare international quality teachers, (3) developing LPTKs as world-class universities.

From the above research results over the last decade, efforts have been made by curriculum developers in almost every country in the world to reform their education systems and review curriculum policies, curriculum design, implementation and evaluation of existing curricula. An initial effort by curriculum developers was required in revitalizing and reforming vocational school curricula to meet the challenges of changing technological, social, economic, national and world environments.

Competence in the opinion of Lynn [10], was a person's ability or ability to integrate the capabilities of knowledge, skills, and attitudes that can be reflected in the form of thoughts and actions. Thompson (1973: 57) argued the competence of vocational education graduates must be in accordance with the needs of the world of work. In general, the competency of SMK graduates must at least consist of cognitive, psychomotor, and affective abilities. Competence of SMK graduates must also be in accordance with the development of the Indonesian National Qualification Framework (KKNI).

The Indonesian National Qualification Framework Standard was a comprehensive and synergic component of national standardization of work competence in order to achieve the goal of standardization of national work competence in Indonesia (Minister Regulation (*Permen*) No. 5, 2012). Through KKNI SMK graduates have been able to formulate work skills covering aspects of knowledge, skills and/or relevant expertise and work attitude to the implementation of duties and terms of office established in accordance with the provisions of the legislation.

Education was essentially aimed to glorify human beings, not just pursuing the ability of thinking or more skill. Learning according to the concept of SMA/SMK/MA curriculum of 2013 was a curriculum oriented to glorify human beings. The 2013 curriculum was designed with the following characteristics: (1) develop a balance between the development of spiritual and social attitudes, curiosity, creativity, cooperation with intellectual and psychomotor abilities; (2) schools were part of a community providing a planned learning experience in which learners implemented the knowledge and skills learned in the school to the community and utilize the community as a learning resource; (3) develop attitudes, knowledge, and skills and apply them in the school and community; (4) provide sufficient time to develop a variety of attitudes, knowledge, and skills; (5) competence expressed in the form of core competencies of the class was detailed further in the basic competencies of each subject; (6) class core competence became the organizing elements of basic competence, in which all basic competencies and learning processes were developed to achieve the competencies shown in core competencies; And (7) basic competencies were developed based on accumulative principles, reinforced and enriched between mathematics and education (horizontal and vertical organizations). The core competencies were designed along with the increasing age of learners in a particular class. Through core competence, the vertical integration of various basic competencies in different classes can be maintained. The core competency formulation used notation (1) *Kompetensi Inti-1* (KI-1) for the core competence of spiritual attitude; (2) *Kompetensi Inti-2* (KI-2) for the core competencies of social attitudes; (3) *Kompetensi Inti*-3 (KI 3) for core knowledge competencies; And (4) *Kompetensi Inti*-4 (KI-4) for core competence of skills (*Permendikbud* No 70 of 2013)**.**

There were four graduates scoring criteria to be achieved at all levels of study in KKNI, including 1) attitudes and values, 2) work skills, 3) knowledge possessed, and 4) authority and

responsibility (*Permen* No 5, 2012). These four criteria will equip the workforce graduates to compete with workers from other countries. Based on some of the above arguments, it can be rated whether the current vocational high school has been able to implement the four criteria for graduation assessment.

II. METHOD

This research used the qualitative method with case study approach. The subjects of this study consist of students, teachers, principals and business as well as industry stakeholders. Techniques of collecting research data used were observation, questionnaires and documentation. This research was conducted at SMKN 2 Depok and SMK Muhammadiyah 3 Yogyakarta. Data analysis technique used was triangulation.

In order to make a more meaningful and easy to understand data presentation, the data analysis step used in this research was interactive analysis model from Miles and Huberman [11]which divided the analysis activities into several parts, including data collection, data reduction, data presentation, and conclusion.

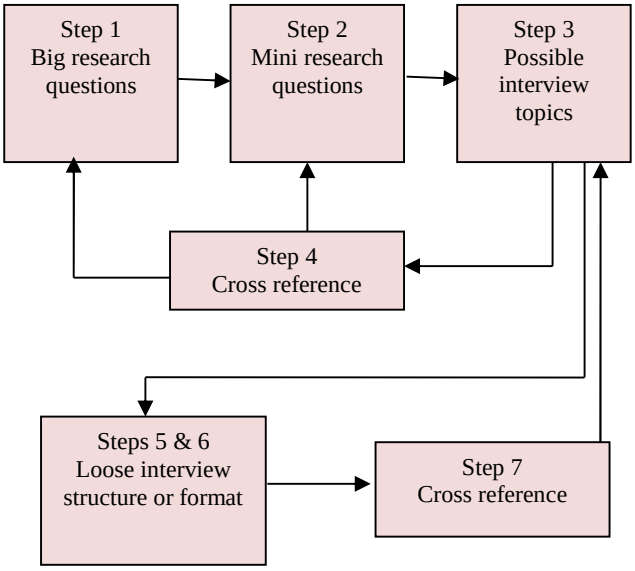

Fig. 1. Planning and Preparation Procedures to Enact an In-depth Interview (Mason, 2002: 72)

In-depth interviews were enacted to obtain valid information in accordance with the actual circumstances directly through the informants as the resources of the information. Through in-depth interviews, the researchers found out the actual circumstances in the field and knew about the informants' personal information. The interview techniques that include the face-to-face meeting between the interviewers and the interviewees constructed information about people, events, organizational activities, feelings, motivation, demands, awareness, and others. The data were constructed through dialogical interactions with the informants and recorded by using digital devices. The procedures of planning and preparation of the interviews were developed based on the Mason model [12].

III. RESULT AND DISCUSSION

Before you begin to format your paper, first write and save the content as a separate text file. Keep your text and graphics files separate until after the text has been formatted and styled. Do not use hard tabs, and limit the use of hard returns to only one return at the end of a paragraph. Do not add any kind of pagination anywhere in the paper. Do not number text heads-the template will do that for you.

Setting Graduate Competency Standards (SKL) for Vocational High School (SMK) is one of the methods a vocational school can take to maintain or improve the competence of its students. SKL can be obtained through the learning activities at school and from the Business and Industrial Worlds (DUDI) – a vocational school subject that engages students to have a field industrial work practice in the real world. The students could improve their basic competencies through the learning activities at school and refine it through the learning activities in DUDI. Learning both competences are very useful for students to gain the expected competencies set by their school.

Field Industrial Work Practice (*Prakerin*) Program or Industrial Practice (PI) is a means to strengthen the competencies that have been obtained by the students at the school. The students could directly experience the environmental conditions through DUDI that they could not get at school. Academically, the students have been taught certain competences comprehensively at school, but they need to strengthen their competencies in depth through DUDI.

The students are required to be able to solve problems or cases they faced when working in DUDI program. They should be able to integrate the basic science they learned at school to be applied in DUDI. In addition, they should be able to identify a cases they face in the real industrial field. This competency was not taught at school. Diverse kinds of cases that occurred in the real industrial field allowed the students to analyze the cases well so that the cases could be easily resolved.

The students must master basic competencies to help them solve cases they face in the real industrial field. Those basic competencies have been taught at school based on the curriculum structure set by the Government. Based on the KTSP Curriculum, vocational school students are required to master the competencies of Local Area Network and Local Computer Network Configuration. Meanwhile, based on the 2013Curriculum, vocational school students should be able to master the package of network engineering expertise.

Beside having Industrial Practice (PI), the Vocational High School attempts to improve the competences of its graduates through the formulation of productive curriculum and DUDI (link and match), productive teacher workshop and DUDI, link and matching materials and practice tools between SMK and DUDI, and establish cooperation (MoU) between SMK and DUDI in terms of increasing the competence of graduate students of the SMK and their recruitment level in workplaces.

Industrial Practice (PI) is also a learning method for the students to develop their competencies. In addition, the students got a lot of experience by following the PI program. The experience improved the students' knowledge and insight

about their work activities, working atmosphere, and other informal things that they cannot get at school. Therefore, the PI program can improve competencies and add the experience of students [13]. The students should undertake several activities to obtain the competencies. The activities were a series of tasks given by mentors and other informal activities undertaken by the students. The students should complete assignments in the place where they have a PI program through several methods. Through these methods, the students were able to acquire competencies taught in the industrial premises.

At the beginning, the students got tasks of observing activities at work. The observations were aimed to know what things are done in the workplace, started the preparation process until post-production activities. These activities ease the students to map the workflows. Observation method is the first task given by the mentors to the students. The students perform the tasks assigned by their mentors through several methods. Observation or observation method was done before students make or produce something. They observed in advance the workflow done by the employees or the mentors by watching attentively the things they did, then they can apply their knowledge from the observations when they were asked to make or produce something.

During the practice in industrial fields, the students are expected to apply positive attitudes toward their task or job. The positive attitudes include patient, positive thinking, persistence. The attitudes are embedded in the students after experiencing the job in the industrial field. For example, sincere attitude performed by the students when they did their task or job may affect the result of their field industrial work practice. The students also experienced the differences in how to respond when they were given a task sincerely or not. A work done based on sincerity will result in good products, while a work done with no sincerity will result not worth selling products. The students got lesson related to the importance of cooperation. The piling jobs in DUDI could not be solved individually, but they required cooperations within employees to be easily resolved. Thus, the experience gained from DUDI was not only in the forms of technical skills, but the students got attitudes that are needed to be improved such as sincerity and cooperation.

Apart from the daily tasks at work, the students also got their competences from the activities they did during the break. When the students have a break, they had chats with the employees and browsed information on the internet. They gained their knowledge from the employees through the conversations. The employees told their experience of working, how to complete the job, and also told stories related to other affairs. This helped the students to learn good experience from the employees and put aside bad experience.

The students also got benefits from the internet facilities provided when they have DUDI. They sought for information related to work-related techniques. In addition, they also learned relevant sciences to the activities in the industrial field through the Internet. Thus, the internet facility was very helpful for the students to find ways or competencies.

The implementation of education in Vocational High School refers to three aspects of competences, namely: (1) adaptive, (2) normative, and (3) productive. Adaptive competency is developed through subjects that contain verbal, numerical, and adaptable values, such as Mathematics, Physics, and Language. Normative competency is developed through subjects containing Norm values, such as Religion and Civic Education. Productive competency is developed through learning in training according to the disciplines chosen to equip students to have competence according to the National Working Competency Standards (SKKNI) established by the Government.

Productive learning is an important part of improving students' skills. Productive learning has two main characteristics, namely competency-based learning and project-based learning. Competency-based learning refers to the competencies that have been planned by SMK and DUDI, while project-based learning refers to the procedures and work standards that are in accordance with the real world of work, so the goods or services produced must be in accordance with the market demands or consumers.

DUDI learning activities in PI program refer to the real procedures and real jobs. The PI program assists the students in developing competencies that they have been mastered at school. The competences concerned were the development of hard skills and soft skills that have not been taught at school. Four patterns that can be implemented in the link and match strategy through industrial or business practices are hour release, day release, block release, or the combination of those three. These four patterns are forms of learning time arrangement at school and DUDI. The hour release pattern regulates the learning hours, day release organizes the day in turns, and block release manages learning activity over a period of 1 to 3 months in turns. Thus, schools can choose the right pattern in the implementation of PI program so that the fulfilment of SKL of their graduates can be done well.

The students gained and developed their competences through the knowledge they get in the industrial field. The knowledge in the industrial field was got from the learning process and learning outcome as described by the informants. The results of this research were related to the learning activities in the industrial field that are in accordance with the learning process and learning outcome. The students equip themselves with the basic competencies that are in accordance with DUDI. DUDI requires certain competencies according to their needs that are aimed the students to adapt to the environment because work that continues and the real job requires certain abilities. Basically, learning from the industrial field is beneficial to strengthen the students' competencies that have been mastered at school which is often monotonous. Thus, the students who do not have the competencies according to the needs of DUDI had difficulties in following the activities in DUDI program. The students should follow the initial orientation before attending activities in DUDI. The orientation is the first program given by DUDI to help students to adapt to the environment. In addition, the orientation aims to strengthen the competences of the students and measure how much they have been mastered the competencies. Thus, DUDI gave the students tasks in accordance with their competencies.

The role of the mentors was very important during the implementation process of PI program. The mentors were assigned to provide directions to the students, monitor the students' activities, and give suggestions or solutions when there were problems faced by the students. The Industrial mentors were the employees of the company who are experts or are the masters of the competency levels. The industrial mentors treated the students well. The mentors did not discriminate the students. The mentors put the students' work based on the basic skills they have mastered. This was intended to facilitate the students in performing the tasks.

The guidance method was done through mentoring. The students are accompanied in carrying out tasks. Such mentoring was done by mentors or employees who recruited the students. The mentoring method led to case handling or case studies. The students were asked to be directly involved in the work. Through this involvement, the students experienced problems or cases by themselves. Therefore, the role of the mentors was as the problem solvers. The mentors provided guidance on how to deal with cases so that the students can handle the cases well.

The mentors provided directions for the students when they were in the field. Before doing the work, the students were given briefings. The mentors involved in the work to train the students to analyze cases and handle them. The role of the mentors was very important when there were problems occurred in the field. The mentors gave examples on how to analyze cases. Like in the above interviews, the mentors analyzed the problems arose in the industrial field and showed the students how to overcome them. After hearing the analysis from the mentors, the students could perform their job properly. The role of the mentors was very important for the students in obtaining competences. The mentors should be able to cope with the students to ease them to absorb the materials. Thus, the students could easily obtain the competencies from the mentors. The ability to build trust and confidence in learners, consider the students' abilities and the ability to encourage students to think hard in deciding something are the main things to have in becoming a mentor [14].

The patterns of guidance in the workplace required social interactions between the students and the mentors. The social interactions are in the form of (a) associative (harmony, cooperation, sharing knowledge and experience); (B) accommodation (mediation); (c) assimilation (tolerance, respect, and open attitude); and (d) acculturation (uniformity). The four components are parts of the interaction. The students together with the mentors engaged in social interactions resulting in the transfer of competencies. The transfer of competencies that students got is in the forms of knowledge, attitudes, and skills. Aspects of transferring competence are knowledge related to work equipment, ethics and aesthetics in work, content, corporate structure, product knowledge, job skills, and attitude in work.

In the higher level, the students would be able to perform or action in solving cases. The students faced cases according to the type of work they already studied, so in case of handling, they did not require a long time to solve it. The students got their learning outcomes after attending some training and practices in the field. The achievement of learning is expected to help the students to master the competencies.

The students learned through activities and tasks given. These learning processes are often called as learning by doing – having activities and complete tasks while they are learning. The students implemented what they learned from the previous observations to complete the assigned tasks. Therefore, being in a workplace help the students to got sources of learning for the knowledge they need to accomplish their tasks. The students made clear contributions at work by following the daily activities. On the other hand, the activities the students had could cause good impact in their learning outcomes. There was a lot of knowledge the students got during the activities in the industrial field. The knowledge was gained directly and real. These experiences could not get at school because it only could experience in the industrial fields where the students had PI activities. The learning by doing become an option for students to gain competences in DUDI. Billett argues [15], "Earlier work has demonstrated the strength of the contribution to learning the knowledge required for work through everyday workplace activities". The students learned from others' experience. In addition, the experience becomes the starting point in the educational process [16]. The mentors always told their experience to the students when talking. The students gained new knowledge based on the experience told by the mentors. Therefore, the students could take lessons and not repeat the same mistakes done by the mentors.

The mentors provided lessons related to the ways to master the competencies. Finding a pattern to solve certain cases requires a long process and a long time. The students are expected to be able to use a pattern without having to search it as the mentors did. Through the pattern learned from the tutor, the students could develop an adapted pattern based on their understandings. The developed pattern is a new competency gained by the students in the workplace.

The students got a lot of experience gained when participating PI program. Analyzing cases and solving them are some experience got by the students in the industrial field. The experience became the keys to the formation of competencies. The experience became the major factors in measuring how much a student master a competence. The experience forms knowledge about work activities, working atmosphere, and other informal things that could not get at school. Fry, H., Ketteridge, S., & Marshall, S. [17] said that "their learning experience has supported students' development as individuals". The students learned to solve problems (learning in problem-solving) through tasks they got. The problems faced would become a valuable lesson for the students. The problems solved would become new knowledge for the students to be used when they are dealing with similar or related cases. All in all, the students would be able to solve a problem based on their experience. The students will find solutions and solve the problem in the future.

Jonassen [18] thought that the goal of learning to solve problems not only to find a solution to every problem but to be able to recognize similar problems in the future to reduce the effort needed to solve the transfer problems at that time.

The students faced certain cases before the network installation. The cases encountered were varied, so the students tried to analyze the case well and thought about the problem-solving mechanism. Through the case, the students learned to deal with a problem or learning in problem-solving. Thus, learning to overcome problems is a mechanism to gain a competence. The students directly experienced the environmental conditions in DUDI that they could not get at school. Academically, the students have been taught the competences comprehensively at school, but they need to strengthen their competencies through DUDI. The impacts generated in the work environment were so great that the students could experience the real conditions in the field. Mercer & Clayton [19] said that the characteristics of group members affect the level of compliance and become the sources of information to guide behaviour. The students showed or demonstrated their learning outcomes through the examinations given by the mentors. The students were required to solve a problem from a case simulation given by the mentors. The case simulation was designed as in the actual situation, so the students could analyze the case. The cases given to the students were the most common cases in the field. Therefore, the result of their learning in DUDI helped the students to demonstrate the problem-solving.

The students followed the PI program with a strong desire to learn and develop themselves through DUDI. The results obtained from the PI program was that the students were able to demonstrate cognitive development in terms of job-related knowledge, psychomotor development through job skills, work-completion skills, and attitudes related to DUDI.

Bambang Sugestiyadi [20] argued that "Vocational Education has implicitly contained elements of thinking (cognitive), act (psychomotor), and sense (affective)". Jones, Voorhees & Paulson [21] said that "demonstrations are the results of applying competencies. It is at this level that performance can be assessed". Demonstrations are the result of the application of competencies and performance levels that can be assessed.

The results showed that the implementation of field industrial work practice was very effective to improve the students' competences. The students gained new competencies that they cannot get at school. Basically, the field industrial work practice program is a part of a link and match that combines learning at school and in the real industrial field. Learning at school is more inclined to strengthen the basic competencies and some competencies that are possible to be applied while learning in the real industrial field engages more practical competences and real conditions in the field. Both components are interconnected each other and could be collaborated well if they are applied maximally.

Moreover, based on the data from tracer study, it can be seen that 80.12% Vocational High School graduates from SMKN 2 Depok during the last three years work in accordance with the competences of expertise owned and 19.88% others have jobs that are not really in accordance with their competences of expertise; The participation rate of Vocational High School graduates in the fulfillment of DUDI labor for the last three years was 91.86%.

Generally, DUDI requires certain competencies in work activities and needs fulfilment. Gangani, McLean, & Braden [22] explained that the competencies required by DUDI are divided into three groups: fundamental competencies, functional competencies, and personal competencies. Fundamental competencies are competencies that must be owned by employees in all areas of work. Functional competencies are competencies to help some specific work activities effectively. Personal competencies are competencies to help employees to get individuals achievements and levels higher.

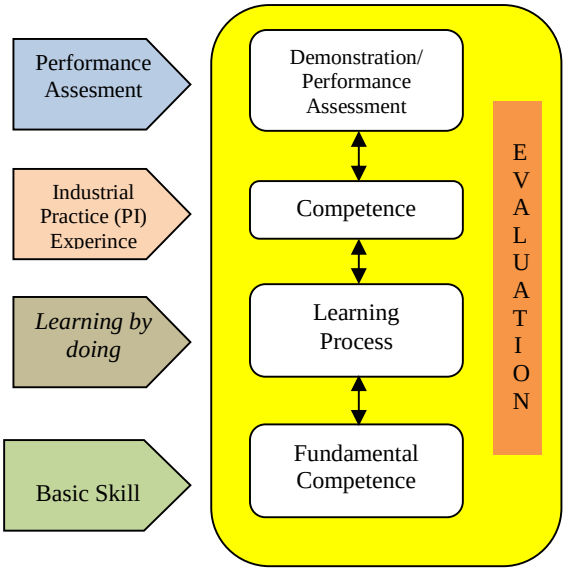

Fig. 2. Hierarchy of Student Competency Formation through Industrial Practice

IV. Conclusion and Suggestion

The results of this study are: Vocational High School attempt to improve the competency of its graduates through the formulation of productive curriculum and DUDI, productive teacher workshop and DUDI, link and match materials and practice tools between SMK and DUDI, internship or field industrial work practice in DUDI for at least 4 months, and the establishment of cooperation (MoU) between SMK and DUDI in increasing the competences and recruitment level of its graduate students; The distribution of vocational high school graduates from SMKN 2 Depok during the last three years were: 80.12% graduates work in accordance with their competences of expertise and 19,88% others have jobs that are not really in accordance with their competences of expertise; The participation rate of Vocational High School graduates in the fulfillment of DUDI labor for the last three years was 91.86%.

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