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Analysis of Curriculum Relevance of Vocational Welding Techniques Competence toward Industrial Practice of Vocational High School Students

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Abstract— Practice of industrial work executed as effort to increase relevance graduate competence of Vocational High School (VHS) with the needs of the workforce. Implementation of industrial work practice expected to be relevant with vocational competence at curriculum. This research aim to know: 1) recovery level of VHS student welding engineering competence during implementation of industrial work practice, and 2) relevance level of expertise competence of VHS student welding engineering associated with implementation of industrial work practice. This research is an ex post facto research, the sample of this research is 155 VHS student of welding engineering expertise in Pangkajene and Islands Regency. The instrument is a questionnaire developed based on basic competence at expertise package of VHS welding engineering. Data analysis technique using descriptive statistic. The conclusion of this research is: (1) average percentage of recovery level of welding engineering competence is 37,28% and included in fair category; and (2) competence relevance of welding engineering package interest in VHS associated with implementation of industrial work practice for Oxi-Acetylene Welding is less relevant with percentage 75,48%, manual arc welding stays in relevant category with percentage 36,77%, weld metal Inert Gas (MIG) stays in category is less relevant with percentage 66,45%, and weld tungsten Inert Gas (TIG) categorizes less relevantly with percentage 82,58%.

Keywords— Relevance Interest, Practice of Industrial Work, Welder Engineering, Student VHS.

I. INTRODUCTION

Regulation number 20 the year 2003 about National Education System section 15 reveals vocational education is secondary education drawing up student to work for certain area [1]. In the purpose of vocational education, it's required to do learning in schools and in industry, called dual system education. Amiruddin [2] gives definition that dual system education is form of organizing education and vocational expertise training that systematically and synchronously combines between education programs in schools and the world of work. Vocational education is education that prepares

students to enter to enter the work field in business and industry world

matching with requirements required by industry and provide allowance to students to develop develop their potential. Vocational education has has its own characteristics and characteristics, causing becomes distinguishment with other education systems, where curriculum developed with a purpose to producing graduate who can work in the industrial world or opens employment, corresponds to the development of science and technological with situation and condition in which they work. Expansion process of potency and character development of each student as a result from synergy between educations taking place in school, family and public. The process gives opportunity to student to develop their potency that is longer increasingly increases in attitudes (spiritual and social), knowledge, and skill necessary for their lives and community life in general, nation, and contribution at prosperity of people life. Study program programmed peculiarly to be carried out in public for example in the form of practice of industrial work. Program practice of industrial work is compiled together between schools and public (Institution dual with Industri) in order to meet the needs of student, at the same time is contribution means for work world to education expansion effort in VHS [3].

Purpose of practice of industrial work, among others: 1) to be actually dual management model of system between VHS and Institusi integrated systematically and systematical of education program in VHS and domination training program of expertise in work world; 2) provide direct job experience (real) to student for the agenda of inculcating (internalize) positive work climate orienting at caring quality of process and result of work; and 3) gives high work ethos allowance for student to enter work world in facing global work market demand [3]. Demand relevance between education worlds with work world in meaning of wide signs the need of mastered by it a number of interests which can be demonstrated when working [4]. VHS is education institute

drawing up the graduate mastering science and interest according to its field. VHS graduate insufficient only masters hard skill only, however also must master soft skill as supporter hard skill that more is able to work is productive and with quality [5]. Adaptation is done to fulfill requirement of educative participant and institution of

couple (industrial world) that interest studied link and match with requirement of work world. Most of VHS in Indonesia has program mechanical engineering skill especially welding technical because work opportunity in welder technical field leaves open wide. The labours in this area required by companys in and overseas. the Government always pushes availability of skillful welder area labour and competence readily enters work world. So form of implementation reality of policy of link and match is dual execution of system in VHS is to bear skilled man power through education in school and work world. Indium the world of work, behavior, work attitude and work character is an important requirement for workers. This is to is prepared by the school ace a simulated workplace: learning how to train and work; trained to obey the rules that apply indium the workplace; training to develop character; initiative to build relationships and socialize and train their peers and teachers [6]. Expertise interest of welding engineering in qualified in VHS that is: Oxy-Acetylene Welding (OAW), Shielded Metal Arc Welding (SMAW), Metal Inert Gas/ Metal Active Gas (MIG/MAG), and Tungsten Inert Gas (TIG). So considered necessary to express relevance welder engineering interest obtained by student in school with in industry through practice of work industry is various by couple industry. This research aim to know level of level of relevance class student interest XII welder in VHS in Pangkep South Sulawesi with activity of practice of work industry with analysing relevance interest: 1) competence obtained by welding engineering student in VHS during executing activity of work industry practice; and 2) relevance level between expertise competence of welding engineering student in VHS with activity of work industry practice.

II. METHOD

A. Research Design

This research is quantitative descriptive research that aim to describe fact and characteristics of objects and subjects are researched appropriately. This is in line with the Arikunto opinion [6] who said that descriptive research only makes a picture of what is going on to the object or region under study, then explains it in bare as it is. This research is also ex post facto where is not done control and also manipulation of research variable so that often called as non experiment research.

B. Sample Size and Sampling Technique

Population is an object or subject having certain quantity and characteristic specified by researcher to be studied and hereinafter pulled conclusion [7]. Arikunto [6] argues that the population is the whole object to be research. Population in this research is class student XI and XII of welding technique

expertise package in Pangkajene and Islands Regency as many as 282 students. Determination of population is based on the reason that industrial work practice is carried out at class student XI and XII so that the research is conducted at VHS student class XI and XII expertise package of welding engineering from three school which have followed industrial work practices. To know the size of samples to be studied then used Slovin formula. Based on sample calculation scale hence it is known that sample used as much as 155, hereinafter is applied proportional engineering of random sampling to know sample from each school.

C. Instrument

The research instrument used is a questionnaire. The questionnaire applied is questionnaire closed with high rise scale as guidance to submit questions or statement with 4 (four) alternative of answer, that is: always (SL), often (Strontium), seldom (JR), and never (TP). The subject choose the answer from fourth option that correspond to the condition experienced in the implementation of industrial work practices. OxyAcetylene Welding (OAW), Shielded Metal Arc Welding (SMAW), Metal Inert Gas/ Metal Active Gas (MIG/MAG) and Tungsten Inert Gas (TIG) instrument are developed based on basic competence and indicators in the curriculum.

D. Data Analysis

Step of descriptive analysis is started with seeking mean, median, mode, international, and distribution of categorisation. Pace gone through in usage of this analytical technique is: 1) make a questionnaire answer distribution table; 2) determines responder answer score with rule of score which has been specified, that is by counting value each question item; 3) total answer score obtained from every responder; 4) the result obtained consulted with table category; 5) calculates Mean Ideal (Mi) and Standar Deviation (SDI) and determines the category. Data trend analysis can be done by the way of determining four (4) category that is very low, low, high and very high; and 6) looks for percentage relevance of student competency of welding engineering skill package.

III. RESULTS AND DISCUSSION

A. Level of Recovery of Welding Engineering Competence in Practice of Industrial Work

Result of research shows score level of recovery of VHS student at OAW in industry stays low value 10 and highest value 32, average of 13.29, median 11, mode 10, standard deviation or deviation 5.16, variance 26.67, and range 22.

Table 1. Percentage and Recovery Criterion of OxyAcetylene Welding Competence

Item	Basic Competence	(%)	Criteria
1.	Conducting plate welding with various position plates on angular and dull joints: positions under the hands (1F & 1G) and horizontal (2F & 2G) using OAW.	34.27	Poor

Item	Basic Competence	(%)	Criteria
2.	Conducting welding of plates and pipes at angular joints: position below hand (1F) and horizontal (2F) using OAW.	32.02	Poor
3.	Conducting welding pipes with pipes on blunt connections: position under the hands that can be rotated (1G) and horizontal position that can be rotated (2G) using OAW.	30,89	Poor
4.	Conducting welding plates, plates and pipes on angular and blunt joints: using brazing and braze welding	34,76	Poor
Average		33.24	Poor

Result of the research shows the score level of recovery of VHS student at manual arc welding engineering interest in school is the lowest score of 15 and the highest value is 52, the average is 32.25, the median is 31, mode 30, standard deviation or deviation equal to 8.97, variance is 80.38, and range is 41.

Table 2. Percentage and Recovery Criterion of Manual Arc Welding Competence

Item	Basic Competence	(%)	Criteria
1.	Conducting plate welding with plate on angular joints and dull position under hand (1F & 1G), horizontal position (2F & 2G) with SMAW.	69.60	Good
2.	Conducting plate welding with pipe at hand position angle joints (1F), horizontal position (2F) and vertical position (3F) with SMAW.	52.20	Fair
3.	Carries out plate welding on vertical (3F & 3G) vertical and vertical position connections, and heads up (4F & 4G) with SMAW.	51.53	Fair
4.	Conducting plate welding on vertical (3F & 3G) angular and vertical position connections, and heads up (4F & 4G) with SMAW.	42.10	Poor
5.	Conducting pipe welding on dulled connections horizontal position (5G), position 45 ° (6G) and with SMAW.	40.56	Poor
Average		53.76	Fair

Result of the research shows that the score level of VHS student recovery on the competence of MIG welding technique in the school stays the lowest value is 16 and the highest value is 61, the average is 21.94, the median is 16, the mode is 16, deviation or deviation standard is 9.4, the variance is 88.53, and the range is 45.

Table 3. Percentage and Recovery Criterion of MIG / MAG Welding Competence

Item	Basic Competence	(%)	Criteria
1.	Conducting plates welding at corner joints and lower hand positions (1F) and horizontal (2F) positions with MIG / MAG welds.	39.27	Poor
2.	Conducting plate welding on dull hand position connection (1G) and horizontal position (2G) with MIG / MAG welding.	36.94	Poor
3.	Conducting plates welding with pipe at angular joints include: position under hand (1F) and horizontal position (2F) with MIG / MAG welding.	33.55	Poor
4.	Conducting welding of various position pipes on dulled connections under 1G and horizontal position (2G) with MIG / MAG welding.	32.74	Poor
5.	Conducting plate welding at vertical position angle connection (3F) and head top position (4F) with MIG / MAG welding.	32.90	Poor

Item	Basic Competence	(%)	Criteria
6.	Conducting plates welding of on blunt connections of vertical position (3G) and upper head position (4G) with MIG / MAG (GMAW) welding.	33.15	Poor
7.	Conducting pipe welding at horizontal angle joint connection (5F) and position 45 ° (6F) with MIG / MAG (GMAW) welding.	32.58	Poor
8.	Conducting pipe welding on dulled connections of horizontal position (5G) and position 45 ° (6G) with MIG / MAG (GMAW) welding.	33.06	Poor
Average		34.27	Poor

Result of the research shows has the score level of VHS student recovery on the competence of TIG welding technique in the school stays the lowest value is and the highest value is 40, the average is 12.73, the median is 10, the mode is 10, deviation standard or deviation is 5.43, variance is 29.51, and range is 30.

Table 4. Percentage and Recovery Criterion of TIG/WIG Weld Competence

Item	Basic Competence	(%)	Criteria
1.	Conducting welding of plates at angular joints and dulled positions under the hand (1F & 1G) horizontal position.	33.47	Poor
2.	Conducting plate welding with pipe at hand position angle joint (1F) and horizontal position (2F) with TIG / WIG weld (GTAW).	31.94	Poor
3.	Conducting pipe welding with pipe on dull hand position joints (1G) horizontal position (2G), horizontal (5G) position and 45 ° (6G) position with TIG / WIG weld (GTAW).	30.69	Poor
4.	Conducting pipe welding using a combination weld on the dull joint position of the hand (1G) and the horizontal position (2G).	32.34	Poor
Average		31.82	Poor

B. Level of Relevance Expertise Competence with Industrial Work Practice

Based on obtainable calculation of statistical about relevance Oxy-Acetylene welding with execution work industry practice. The data is presented at Table 5.

Table 5. Level of Relevance of Oksy Acetylene Welding with the Implementation of Industrial Work Practices

Item	Category	Interval	Frequency	%
1.	Less Relevant	< 7	117	75.48
2.	Quite Relevan	7 - 10	27	17.42
3.	Relevant	11 - 13	10	6.45
4.	Very Relevant	> 13	1	0.65
Total			155	100.00

Based on obtainable calculation of statistical about relevance manual arc welding with execution of work industry practice. The data is presented at Table 6.

Table 6. Level of Relevance Manual Arc Welding with Execution of Industrial Work Practice

Item	Category	Interval	Frequency	%
1.	Less Relevant	< 7	12	7.74
2.	Quite Relevan	7 - 10	49	31.61
3.	Relevant	11 - 13	57	36.77
4.	Very Relevant	> 13	37	23.87
Total			155	100.00

Based on obtainable calculation of statistical about relevance weld MIG with execution of practice of work industry. The data is presented at Table 7.

Table 7. Level of Relevance MIG Welding with Execution of Industrial Work Practice

Item	Category	Interval	Frequency	%
1.	Less Relevant	< 4	103	66.45
2.	Quite Relevant	4 - 5	32	20.65
3.	Relevant	6 - 7	15	9.68
4.	Very Relevant	> 7	5	3.23
Total			155	100.00

Based on obtainable calculation of statistical about relevance weld TIG with execution of practice of work industry. The data is presented at Table 8.

Table 8. Level of Relevance TIG Welding with Execution of Industrial Work Practice

Item	Category	Interval	Frequency	%
1.	Less Relevant	< 4	128	82.58
2.	Quite Relevant	4 - 5	15	9.68
3.	Relevant	6 - 7	8	5.16
4.	Very Relevant	> 7	4	2.58
Total			155	100.00

Based on result of research is obtained by data that level of recovery of interest during executing practice of work industry expertise package student of welder engineering in VHS for weld interest OAW 33.24%, SMAW 53.76%, MIG/MAG 34.27%, and TIG 37.28%. Interest obtained by student during practice of work industry has not fully accommodate all interests of the curriculum in VHS. Student obtains performance and knowledge in school in the form of theory then obtains skill in industrial world, but has not all obtained by student in execution of practice of work industry. Result of analysis also indicates that relevance weld interest OAW with execution of practice of work industry stays in category is less relevantly with percentage 75.48%, relevance SWAW with execution of practice of work industry stays in relevant category with percentage 36.77%, relevance weld interest MIG/MAG with execution of practice of work industry stays in category is less relevantly with percentage 66.45%, and relevance weld interest TIG with execution of practice of work industry stays in category is less relevantly with percentage 82.58%. Based on the data it is known that not all interests is practiced by student during execution of practice of work industry. Above the thing unmatched to purpose of dual program of system, namely to reach domination of performance of certain expertise, as which expressed that education of double system or practical is a form of the management of education of vocational expertise, which synthesize the programmatically and synchronously in VHS and domination program of expertise gotten through working directly at relevant work area, directional to reach domination of performance of expertise [9]. Practice of industrial work is study program that is must be done by every educative peseta in work world especially for student VHS [10] [11]. Execution

of practice of industrial work ought to as according to curriculum VHS related to interest which must be mastered by educative participant. Vocational Interest basis and interest of welder engineering having the character of practice, executed in school and established and development at industrial world in the form of practice of work industry. Industrial world as institution of couple perform [a] agreement with VHS either in writing and also oral to cooperate in execution of practice of work industry. Theory allowance and practice of basis which have been owned student during in school can be application in industrial world. The thing is meant that each student to obtain experience of reality to execute various work types as according to study program that is on the market by school to industrial world. Every student must experience every activity done in industrial world at the time of executing practice of work industry. Daily note can express program performance of learning which on the market by school. Just such interest which have been done and which has not or might not be given to student during practice of work industry. Many knowable things from note of student, including in it tuition intensity by

instructor, job description, office hours given, time for resting, situation of work etcetera. Student interest VHS would as according to work world interest if industrial world give training to work to student. In line with practice of work industry that is a workforce having level of skill knowledge and work ethos as according to employment demand. Therefore, both parties involves and responsible in forming professional graduate and ready for use in industrial world. Practice of work industry basically is property and responsibility with between education institutes and institution of the couple. Planning of practice of work industry which has been compiled in syllabus, has not entirely can be done in industry to causes student cannot add or increases experience as according to the interest. Limitation of supporting facilities owned by industry is one of resistance causing student cannot practice interest which ought to be done. This thing is not unmatched to purpose of execution of practice of industrial work that is giving practical experiences to participant so that result of training increases wide [12].

1 IV. CONCLUSION

Based on data analysis can be concluded that : (a) Level of recovery of interest during executing practice of work industry expertise package student of welder engineering in VHS for OAW 33.24%, SMAW 53.76%, MIG/MAG 34.27%, and TIG 37.28%. So thereby execution practiced work industry expertise interest of student welder engineering VHS only reach percentage average of recovery of weld engineering interest 37.28% and included in unfavourable category. (b) Relevance expertise package student interest of welder engineering in VHS with execution of practice of work industry for OAW stays at category is less relevantly with percentage 75.48%, SMAW stays in relevant category with percentage 36.77%, MIG/MAG stays in category is less relevantly with percentage 66.45%, and weld TIG categorizes less relevantly with percentage 82.58%.

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