

Competency of vocational schools required by construction industry in consultants' supervisor

R W Daryono¹, A P Yolando², A Jaedun² and N Hidayat²

¹ Postgraduate Program of Technological and Vocational Education, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia

² Department of Civil and Planning Education, Faculty of Engineering, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia

E-mail: rihab0561pasca.2019@student.uny.ac.id

Abstract. This study aims to find out how much the needs of personal competence, basic knowledge, and work skills of vocational graduates Construction and Property Technology Expertise Program by the world of Construction Services Industry which is engaged in the Field Supervision Consultant. The method used to select the sample is the quota sampling and snowball sampling method where the sample is 15 companies with a population of 136 companies. The results of this study draw conclusions as follows: (1) overall competence of vocational school graduates construction and property technology expertise program included in the "very needed" category with value of 81,52 (2) personal competence included in the "very needed" category with value of 86,59, (3) basic knowledge competence included in the "needed" category with value of 80,52, and (4) competence of work skills is included in the "needed" category with a value of 78.60.

1. Introduction

The construction service industry is one of the industrial sectors that carry out development activities. Products from the construction service industry are buildings, roads, bridges, rails and rail bridges, tunnels, water and drainage buildings, sanitation buildings, aircraft runways, docks, power plant buildings, transmission, distribution and communication network buildings. Construction in Indonesia makes Indonesia one of the largest construction markets in ASEAN. The construction market consists of the construction work market, the construction labor market, and the construction materials market. The value of infrastructure investment in Indonesia in 2010-2025 is estimated to reach more than 1,700 trillion rupiah, which has an impact on increasing the needs of construction workers, both skilled and skilled workers by 48 million people [1].

The results of a survey conducted by the World Bank in 2008, employers stated that it is almost generally assumed that skills requirements will increase in the coming years, there are higher quality standards, a more competitive and export-oriented business environment such as the main driver to increase requirements. This is in line with Indonesia's ideals of becoming a high-income country, macroeconomic trends (ASEAN, rising wages in China) and rising middle class [2]. One of vocational



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education characteristics is preparing the students to enter the world of work. The workforce preparation of vocational students have to based on demands driven principal to adjust the need of world of Works thus the communication between schools and industry about the need of labour is important to established link and match between education and world of work [3].

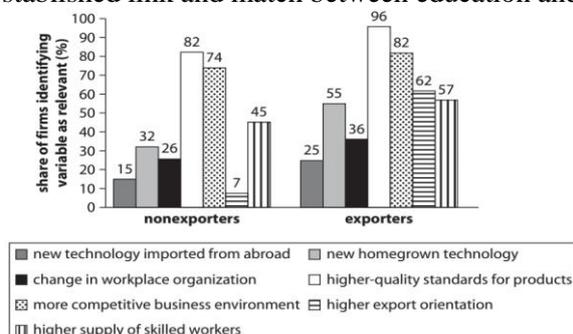


Figure 1. Drivers of firms increased use for skills

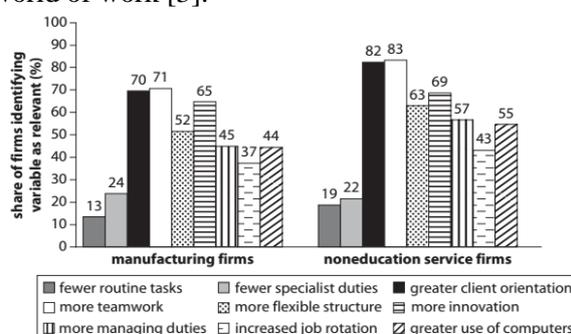


Figure 2. Changes in work organization driving demand for skills

Educational goals are divided into general goals and special goals. The specific objectives of vocational secondary education are (1) preparing students to be productive, able to work independently, fill existing job openings as secondary level workers according to their competencies in the chosen expertise program; (2) preparing students to be able to choose a career, be tenacious and be persistent in competence, adapt to the work environment and develop professional attitudes in the areas of expertise they are interested in; (3) equipping students with science, technology, and art to be able to develop themselves in the future both independently and through higher education levels; and (4) equipping students with competencies that are in accordance with the chosen expertise program [4].

The problem aroused is that the students lack of confidence in doing certain hair cutting and barber techniques because they have high risks. The schools also do not provide the students with adequate practical equipment that correspond to the development of the industry thus the students are not ready when going to the workplaces. Moreover, the other problem is that some skills are not really used in the workplaces such as traditional bun and hair pieces. These skills are usually only used by beauty salons that provide special makeup and for weddings. The skills are not used in regular beauty salons because the consumers usually go for body care [5]. Vocational High Schools have the primary mission to produce skilled workforce and in accordance with employment needs. In addition, Vocational Education graduates also have the opportunity to continue their education to a higher level (higher education), but are also expected to be able to create their own employment as independent entrepreneurs [6].

Based on the above understanding, Vocational Schools are built to prepare students to enter the workforce after completing their education in Vocational Schools. If vocational students can immediately work after graduation, it will have the opportunity to reduce the number of unemployed people in Indonesia. However, according to data from the Central Statistics Agency (BPS) in 2019, seen from the level of education in February 2019 [7], the Open Unemployment Rate (TPT) for SMKs is still the highest among other education levels, which is 8.63 percent. Open unemployment rate is an indicator that can be used to measure the level of labor supply that is not used or not absorbed by the market. In other words, there is a supply of labor that is not absorbed especially at the vocational education level.

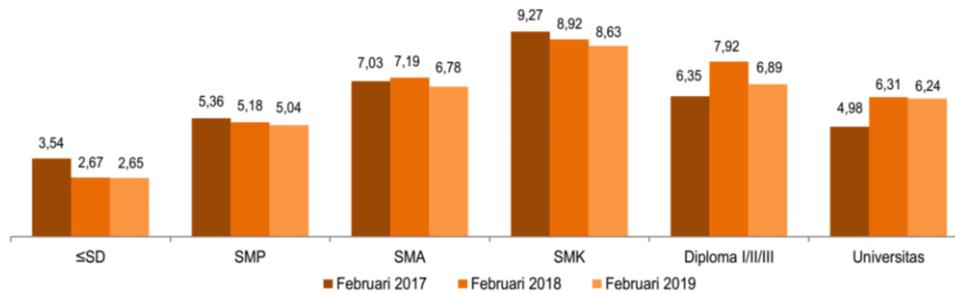


Figure 3. Open unemployment rate in indonesia

2. Method

The population of this research is the Construction Services Industry business entity in Yogyakarta which is engaged in field supervision services. The sample used was 15 construction service business entities engaged in field supervision services from 136 business entities incorporated in INKINDO. The sample selection uses quota and snowball sampling methods in which quota sampling is used from 15 companies of at least 1 class B company, 3 class M companies, and 11 class K companies [8].

What is meant in this qualification is the qualification in the field supervisor service not the company class qualification although the company class qualification is also carried out from class K to class B. The purpose of class K is a small company, M is a medium company, and B is a big company.

Table 1. Sample list of construction services business entities

No	Name of Companies	Class of Compaies
1	PT. Kala Prana	Small company
2	CV. Enkorp	Small company
3	PT. Proporsi	Small company
4	CV. Archira	Small company
5	PT. Tri Patra Konsultan	Small company
6	PT. Titimatra Tujutama	Big company
7	PT. Surya Praga	Small company
8	PT. Laudza Engineer Consultant	Medium company
9	PT. Pola Data Consultant	Medium company
10	PT. Tumoto Karya	Medium company
11	PT. Arsigraphi	Small company
12	CV. Asri Mulia Konsultan	Small company
13	PT. Wastu Anopama	Small company
14	CV. Multi Citra Graha	Small company
15	PT. Multi Visi Karya	Small company

A good instrument is that it must meet two important requirements, namely valid and reliable. To find out the validity and reliability of the instrument, a trial was held first. The results of this trial are used to determine the validity and reliability of the instrument [9]. The research instrument in this study was using a questionnaire, with Linkert measurement scale with four answer choices. The four answer choices to the question are very much needed (MN) with a score of 4, needed (N) with a score of 3, quite needed (QN) with a score of 2 and less needed (LN) with a score of 1.

Table 2. Sample list of construction services business entities

Classification	Description
Much Needed (MN)	If the respondent considers that the competency curriculum of the Construction and Property Technology Vocational School is very much needed in the construction service industry where the work intensity requires very high competence
Needed (N)	If the respondent considers that the competency curriculum of the Construction and Property Technology Vocational School is needed by the construction service industry where the work intensity requires high competence
Quite Needed (QN)	If the respondent thinks that the competency curriculum of the Construction and Property Technology Vocational School is sufficiently needed the construction service industry where the work intensity that requires competence is quite high.
Less Needed (LN)	If the respondent considers that the competency curriculum of the Construction and Property Technology Vocational School is less needed by the construction service industry where the work intensity requires less competency

Data analysis uses quantitative descriptive statistics with percentages to provide a description of the variables obtained. Descriptive analysis steps in the data of this research instrument are (1) tabulating answers from respondents in order to facilitate the process of data analysis, (2) finding the number of values of each question item, (3) calculating the percentage of data that has been collected, (4) using a normal distribution curve.

3. Results and discussions

3.1. Personal competency of vocational in construction and property technology

From the results of the analysis that has been done using percentage, the following results are obtained.

Table 3. Results of the personal competency questionnaire calculation

Personal Competence	Percentage	Interpretation
Have high self confidence	92%	Very needed
Easy to adjust to the new work environment	93%	Very needed
Want to learn new things related to the work carried out	90%	Very needed
Want to try new methods for completing work to be more efficient	85%	Very needed
Can work with a lot of instructions from superiors	80%	Needed
Can receive criticism in doing work	87%	Very needed
Can work within tight deadlines	88%	Very needed
Able to complete work in accordance with criteria set by the company	92%	Very needed
Carry out the work carefully and carefully	88%	Very needed
Responsible for all tasks given	90%	Very needed
Able to find various information needed through electronic media	82%	Very needed
Being able to make the best decisions related to the implementation of work	88%	Very needed
Able to carry out work efficiently	87%	Very needed
Able to carry out work according to priority scale	85%	Very needed
Able to display work results that are better than requested	85%	Very needed
Being able to argue and provide rational explanations about work	80%	Needed
Able to explain the implementation of work both verbally and in writing	82%	Very needed
Able to coordinate in the completion of work	87%	Very needed
Want to help colleagues to achieve project goals	85%	Very needed
Able to build good relationships with other workers	87%	Very needed

Competence with the highest percentage is easy to adjust to the new work environment with a percentage of 93% and falls into the category of much needed in the world of the Construction Services Industry. This is actually very much in accordance with the Competency Standards of Vocational School Graduates [10] in the dimension of attitude which states that graduates can "be responsible for interacting effectively with the social and natural environment and in placing themselves as a reflection of nationalism and social relations". The lowest percentage value from this category is 80% for competence to work without a lot of boss's intuition and competence is able to reason and provide a rational explanation of work.

Personal competence consisting of 20 competencies after analysis of the total number of scores obtained and the average, the results are as follows.

Tabel 4. Personal competency score result data

No.	Name of Companies	Score
1.	PT. Kala Prana	69
2.	CV. Enkorp	76
3.	PT. Proporsi	40
4.	CV. Archira	71
5.	PT. Tri Patra	66
6.	PT. Titimatra Tujutama	78
7.	PT. Surya Praga	80
8.	PT. Laudza Engineer Consultant	67
9.	PT. Pola Data Consultant	65
10.	PT. Tumoto Karya Konsultanindo	61
11.	PT. Asrigraphi	77
12.	CV. Asri Mulia Konsultant	62
13.	PT. Wastu Anopama	68
14.	CV. Multi Citra Graha	80
15.	PT. Multi Visi Karya	79
Total		1039
Average		69,27
Converting a Score to a Scale of 100		86,59

Of the 15 companies that became respondents obtained an average score of 69.27 which, if converted to a scale of 100, obtained 86.59 and included in the category "Very Needed".

3.2. Basic knowledge competency of vocational in construction and property technology

From the results of the analysis that has been done using the percentage the following results are obtained. Competence with the highest percentage is able to read work drawings with a percentage of 92% and is in the category of much needed due to the scope or responsibilities of a supervisor's work. In the explanation of the scope of work of a supervisory service one of the jobs is to ensure that the construction work being carried out is in accordance with the final design. So it is important for a SMK graduate who wants to be a field supervisor to be able to read work drawings and be able to provide technical assistance or advice if the work does not match the work drawings available. The ability to write documents in English well is included in the category of sufficient required with the lowest percentage of 57.5% by the world of the Construction Services Industry Field Supervision Services because as explained earlier competency that the projects handled by the company being the respondent are still local projects.

Basic knowledge competence which consists of 13 items of competence after analysis of the total number of scores obtained and the average, the results are in Table 6.

Table 5. Results of calculation of questionnaire competency in basic knowledge

Personal Competence	Percentage	Interpretation
Able to carry out Occupational Safety and Health procedures in the implementation of building construction work	83%	Very needed
Able to overcome problems related to the implementation of construction work in the field	85%	Very needed
Able to understand working drawings	90%	Very needed
Able to read working drawings	92%	Very needed
Understand the Work Plan and Requirements for building construction work	87%	Very needed
Able to implement Work Plans and Terms for building construction work	87%	Very needed
Able to use a computer application program for working drawings	88%	Very needed
Able to use computer application programs to estimate the cost of construction work	87%	Very needed
Able to use Indonesian verbally well	80%	Needed
Able to use local languages (Javanese) verbally well	67%	Needed
Able to speak English well	62%	Needed
Able to write documents in English well	57%	Needed enough
Able to use Indonesian in writing well	83%	Very needed

Table 6. Basic knowledge competency score result data

No.	Name of Companies	Score
1	PT. Kala Prana	43
2	CV. Enkorp	48
3	PT. Proporsi	26
4	CV. Archira	38
5	PT. Tri Patra	39
6	PT. Titimatra Tujutama	50
7	PT. Surya Praga	52
8	PT. Laudza Engineer Consultant	40
9	PT. Pola Data Consultant	37
10	PT. Tumoto Karya Konsultanindo	38
11	PT. Asrigrapi	41
12	CV. Asri Mulia Konsultant	34
13	PT. Wastu Anopama	45
14	CV. Multi Citra Graha	50
15	PT. Multi Visi Karya	47
Total		628
Average		41,87
Converting a Score to a Scale of 100		80,52

Of the 15 companies that became respondents, an average score of 41.87 was obtained, which if converted to a scale of 100 would obtain 80.52 and fall into the "Needed" category.

3.3. Vocational competencies in work skills in construction and property technology

The highest percentage of work skills competency is able to calculate the volume of work in the construction of buildings which gets a percentage of 87%. The possibility of this point gets the highest

percentage because companies are more demanding of vocational school graduates to have the ability to calculate the RAB and also possibly due to the company using a lot of vocational school graduates to calculate the RAB of a building.

The lowest percentage of work skills competency is to understand the technical implementation of earthworks for the implementation of building construction work and to understand the technical implementation of wood construction work on building construction work which obtains a percentage of 73%. The percentages made in each of these competencies will then be used in categorizing whether the competencies are included in the competencies that are needed, needed, needed enough, or less needed.

From the results of the analysis that has been done using the percentage the following results are obtained.

Table 7. Results of the calculation of work skills competency questionnaire

List of Competencies	Percentage	Interpretation
Able to design the stages of the implementation of building construction work	78%	Needed
Able to make various drawings for the implementation of construction work	82%	Very needed
Able to plan the use of tools for carrying out construction work	80%	Needed
Able to plan the use of materials for carrying out building construction work	85%	Very needed
Understand the technical implementation of the measurement work required in the implementation of building work	78%	Needed
Understand the technical implementation of earthworks for the implementation of building construction work	73%	Needed
Understand the technical implementation of the work of roof structures in building construction work	77%	Needed
Understand the techniques for carrying out ladder structures in building construction work	75%	Needed
Understand the technical implementation of wood construction work on building construction work	73%	Needed
Understand the technical implementation of concrete construction work on building construction work	75%	Needed
Understanding the technical implementation of reinforced concrete work on building construction work	77%	Needed
Understand the technical implementation of steel frame construction work on building construction work	75%	Needed
Understanding the technical implementation of light steel on construction work	74%	Needed
Understand the technical implementation of building finishing work	80%	Needed
Understand the technical implementation of utility in building construction	78%	Needed
Understand the technical implementation of building construction repair work	77%	Needed
Understand the techniques of carrying out building maintenance work	75%	Needed
Able to calculate the volume of work on building construction implementation	87%	Very needed
Able to calculate the material requirements in carrying out construction work	85%	Very needed

List of Competencies	Percentage	Interpretation
Able to calculate the estimated cost of carrying out building construction work	80%	Needed
Able to estimate the time to carry out building construction work	78%	Needed
Able to check the results of the implementation of construction work	83%	Very needed
Able to make progress reports on the implementation of construction work	82%	Very needed
Able to create a Time schedule for the implementation of construction work	78%	Needed
Able to make S Curves for the implementation of building construction work	80%	Needed

The highest percentage of competence is being able to calculate the volume of work in the construction of buildings, a percentage of 87% and a category that is highly needed by the construction services industry. This is according to level 2 qualification parameters (Attachment of Presidential Regulation No. 8, 2012) able to carry out one specific task, using tools, and information, and work procedures that are commonly performed, under the direct supervision of his superiors. While the lowest competence is competence "understanding the technical implementation of earthworks for the implementation of building construction work" and competence "understanding the technical implementation of wood construction work on building construction work" with a score of 73%.

Work skills competence consisting of 25 items after analysis of the total number of scores obtained and the average results are as follows.

Table 8. Data on work skills competency score results

No.	Name of Companies	Score
1	PT. Kala Prana	100
2	CV. Enkorp	93
3	PT. Proporsi	50
4	CV. Archira	58
5	PT. Tri Patra	75
6	PT. Titimatra Tujutama	98
7	PT. Surya Praga	100
8	PT. Laudza Engineer Consultant	84
9	PT. Pola Data Consultant	75
10	PT. Tumoto Karya Konsultanindo	66
11	PT. Asrigraphi	74
12	CV. Asri Mulia Konsultant	76
13	PT. Wastu Anopama	61
14	CV. Multi Citra Graha	76
15	PT. Multi Visi Karya	93
Total		1179
Average		78,60
Converting a Score to a Scale of 100		78,60

Of the 15 companies that were respondents, an average score of 78.60 was obtained and did not need to be changed to a scale of 100 because it was already on the 100 scale and included in the "Needed" category.

3.4. Level of competency needs graduates of smk construction and property technology in the construction services industry field supervision services

Overall, the competency needs of SMK graduates required by the Construction Services industry both from personal competence, basic knowledge, and work skills in the Special Region of Yogyakarta and from 15 companies that became respondents obtained an average score of 189.73 which, if converted to scale 100 will be obtained 81.58 and included in the category "Very Needed".

From the three groups, it was found that the results of the competencies that received the highest average were in the personal competency group.

Table 9. Average of the three groups

No.	Competency Group	Average
1	Personal Competence	86,59
2	Basic Knowledge (Core Skill)	80,52
3	Job Skills	78,60

4. Conclusion

Based on the results of research and discussion, the conclusions from the research Competencies of Vocational School Graduates in the Construction Technology and Property Skills Program Needed in the Construction Services Industry of the Supervisory Consultant Sector in the Special Region of Yogyakarta is overall, from the three competency groups studied, it was found that the competence of graduates of the Construction and Property Technology Expertise Program is needed by the world of the Construction Services Industry with a value of 81.58. As for the three groups of competencies more needed are personal competencies with an average yield of 86.59.

The personal competency group of vocational graduates in the Construction and Property Technology Expertise Program is very much needed by the Construction Services Industry world with a value of 86.59 where the more needed competence is "easy to adjust to the new work environment" with a score of 93% while the competence those with the lowest needs are competence "able to work without a lot of instructions from superiors" and competence "able to reason and provide rational explanations about work" at 80%

The basic knowledge competency group of Vocational School graduates of the Construction and Property Technology Expertise Program is needed by the world of Construction Services Industry with a value of 80.52 where the more needed competence is "able to read working drawings" with a score of 92% while the greatest competency needs the most low is competence "able to write documents in English well" with a score of 80%.

The competency group work skills of SMK graduates in the Construction and Property Technology Expertise Program are needed by the world of Construction Services Industry with a value of 78.60 where the more competency needed is "able to calculate the volume of work in the implementation of building construction" with a score of 87% while the highest competency with the lowest requirement is competence "understanding the technical implementation of earthworks for the implementation of building construction work" and competence "understanding the technical implementation of wood construction work on building construction work" with a score of 73%.

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