

Internship Students' Work Readiness: Case Study in Metal Machining Department at Yogyakarta Vocational Training Center

Slamet Priyanto^{1*}, Rochmad Novian Inderanata²

¹Mechanical Engineering Education, Sarjanawiyata Tamansiswa University, Yogyakarta, Indonesia

²Graduate of Mechanical Engineering Education, Yogyakarta State University, Yogyakarta, Indonesia

*Corresponding author: slametpriyantompd@gmail.com

Received December 14, 2019; Revised January 18, 2020; Accepted February 14, 2020

Abstract This research was conducted with the aim of wanting to find out about the work readiness of the trainees in terms of mental aspects (affective), intellectual aspects which include cognitive and psychomotor. This research was carried out specifically in the machine tool department at the Yogyakarta Vocational Training Center during the period September - December 2019. The subject of this study was 20 internships who participated in basic skills training for 4 months in the production machinery department. The unit of analysis of this study is the ability of students which includes mental readiness and intellectual readiness (cognitive and psychomotor). Mental readiness is tracked by observation using observation guidelines or check lists. Cognitive abilities are explored using objective test questions. While psychomotor abilities are tracked by observation and measuring the workpieces of the interns' practice. Data are identified and described, then analyzed with basic statistics. The results of the basic analysis are transferred to the qualitative statement. The results of this study found that of 20 internships reaching 20% of mental attitudes less ready for work and 80% of mental attitudes ready for work. While the cognitive abilities of the 20 internship participants reached 30% less ready for work, 30% were quite ready to work and 40% were very ready to work.

Keywords: work readiness, internships, training, basic skills, vocational training center

Cite This Article: Slamet Priyanto, and Rochmad Novian Inderanata, "Internship Students' Work Readiness: Case Study in Metal Machining Department at Yogyakarta Vocational Training Center." *American Journal of Educational Research*, vol. 8, no. 2 (2020): 105-111. doi: 10.12691/education-8-2-6.

1. Introduction

Indonesia as a developing country is now actively implementing development in order to improve competitiveness to create a prosperous, just and sustainable society. To achieve the goal of realizing a prosperous, just, and sustainable society, Indonesia is carrying out development in stages, and is currently stepping on stage IV. In the IV national midterm development, the Indonesian people are increasing added value in order to achieve industrial society.

To create an industrial society, a workforce is needed at all levels and various types of vocational training that have high intellectual abilities and skills, are able to innovate, have high thinking creativity and are adaptive to the use and systematic thinking framework.

Referring to the [1], that to support the achievement of the take-off program in order to realize an advanced and independent industrial society needed a workforce at all levels of quality, flexible and responsive education

Besides improving the quality of human resources to reach industrial society, Indonesia's economic growth

must be stable. Economic growth is not only high, but has a maximum absorption of labor.

Indonesia as part of Southeast Asian countries, both directly and indirectly faces fierce competition in free trade in the present and future

In order for the Indonesian nation to enter the global market at the ASEAN and APEC levels in 2020, especially in the labor sector, it must be prepared in such a way as to be able to provide with the understanding of being able to graduate workers who are able to compete in quality. Likewise, in trading to be able to compete in the free market, the production of goods must have standardization, have high quality, high precision, have high efficiency and effectiveness, especially products of the industrial sector [2]. To introduce and market Indonesian products internationally and to be competitive in the world market, skilled workers must be produced through a flexible training system. In relation to the workforce needed in order to accelerate industrialization, there is a great need for middle-level labor, especially for the industrial sector [3].

Vocational High School is a formal educational institution whose job is to educate skilled mid-level workforce candidates to fill and strengthen the ranks of the machining industry in order to support the creation of

an industrial society. Quantitatively, in Indonesia there are already enough middle-level workers (Vocational High School graduates) and even too many. However, graduates of Vocational High Schools (VHS) have not been able to enter the job market in the industrial sector, it can even be said to have not been able to support the realization of industrial society, not even ready because their skills are still low and lack of knowledge [4].

According to a World Economic Forum survey in August 2019 to examine attitudes towards work and skills, and the impact of technology on the future of work is shown in Table 1 below.

Table 1. Assessment of education level and skills for the labor market in Indonesia

Education and Skills				
Out-of-date	Need to be constantly updated	Will last for another five years before I need to retrain	will last for another 10 years before I need to retrain	will last for most of my life
8%	49,9%	14,8%	6,6%	20,7%

Source: World Economic Forum, August 2019.

Awareness of the potential disruptions and challenges of the 4.0 industrial revolution related to the employment prospects of ASEAN young people especially Indonesia that: 1) 9.2% believe that their skills are now outdated; 2) 52.4% believe that they must improve their skills always; 3) 5.7% of respondents reported job loss either because their skills were no longer relevant or because technology replaced their jobs; 4) 14.1% say they learned their most important skills through formal on-the-job training [5]. Furthermore, around 81.4% of ASEAN young people believe that internships are as important or even more important than training in schools [5].

According to [6], VHS education lacks job opportunities compared to General High School (GHS) education. Lack of employment opportunities is possible because: 1) special job skills acquired and transmitted through technical or vocational curriculum do not produce results in the short term in the case of a direct transition to employment (for example: links to the labor market, expansion of work, compatibility between technical curricula and market demand short-term workforce [7]; 2) a mismatch of quality skills and competencies between vocational education and the labor market [8]; 3) the existence of schools that are less productive [9]; 4) industry dissatisfaction with VHS graduates of positive mental attitude towards work, high cognitive abilities, and adequate psychomotor abilities (intellectual abilities that can encourage creativity, innovative ability, adaptive to technological development and industrial culture) [10]

In real quantitative terms based on the latest data by the Indonesian Central Statistics, the level of open unemployment rate (OUR) of workers in secondary education can be seen in Table 2.

Table 2. Open Unemployment Rate of Workers in Secondary Education

OUR	August 2019
Junior High School (JHS)	4,75 %
Senior High School (SHS)	7,92 %
Vocational High School (VHS)	10,42 %

Source: Indonesian Central Statistics.

The open unemployment rate for secondary education especially Vocational High School is the highest unemployment which is 10.42% compared to other secondary education. The low absorption of labor is likely due to the lack of flexibility in the vocational program, namely the quality of graduates who lack or do not meet the job requirements expected by employment; and the types of expertise that do not match the skills required by increasingly diverse types of work.

To improve the quality of vocational graduates (especially industry clusters) and reduce the gap between the workforce requirements required by the industry and the output of vocational schools, the Ministry of Education and Culture, especially the Directorate of Vocational High School Development, implements the implementation of dual system education.

However, dual system education can only be attended by young people of school age or youth who are still studying in formal education at VHS, cannot be followed by youth who graduate from formal education (have graduated from VHS) or middle school age youth groups but cannot continue formal school because of limited funds. In addition, various types of jobs and the dynamic change in job qualifications in the industrial sector may not be followed by a variety of majors in vocational schools quantitatively and qualitatively because curriculum in formal education pathways including vocational schools can only be reviewed within a certain period of time. This is a particular problem for workers who have entered the labor market and who have not yet found a place to work.

The education system in Indonesia has both formal education and non-formal education channels. Vocational Training Center (VTC) is an institution under the auspices of the Office of Manpower and Transmigration, which is a non-formal education channel that provides in-service training and on the job training in order to prepare workers for use [11].

As a non-formal educational institution, VTC is obliged to provide students with the necessary knowledge and skills in accordance with job and job qualifications required by the dynamically changing industry sector as a provider of employment, so that if the relevant workforce enters the market work ready to work. In addition to the vocational training center as a training ground, it must have facilities, short-term curriculum or training packages for a certain period of time, the quality or characteristics of course participants are important elements for the success of job training. Therefore, to find out the effectiveness and efficiency of the implementation of the training then after a certain period of time there needs to be an evaluation.

Internship is an education and training process that is carried out in an integrated and tiered or gradual manner in educational and training institutions and works directly in the production or service process that is bound in the internship contract. The internship was carried out for a period of 3 years, which was carried out at the vocational training center and the company. The first year is held in two places, namely the first 4 months at the vocational training center and the next 8 months at the company. The internship in the first four months in VTC is an activity

that aims to provide vocational basic skills (organized basic training) as capital for activities in the company.

The company is a work unit that prioritizes benefits, so it is natural that the company does not want to be hampered by its productivity as a result of the workforce of apprentices. In relation to this, there is a need for adequate initial capacity for apprentices as a result of activities in the VTC. Therefore, research on the work readiness of apprentices is very necessary.

2. Literature Review

The youth employment competency (YEC) system will provide participants with needed skills, knowledge, attitude and behavior in the areas of job finding, getting, retaining, and advancing, basic skills, and occupational proficiencies [12].

Competency attainment will not be primary planned outcome for any youth, but rather will be seen as a job placement/marketing tool to help move clients into the labor force. Youth employment competencies in and of themselves comprise the necessary components of job readiness or employment competence [12]

From the explanation above, the components needed for work readiness or work competence include skills, knowledge, attitudes, and behavior.

The typology of knowledge, skills and competence includes conceptual and operational. Conceptually, it consists of occupational cognitive competence (knowledge) and personal meta-competence (facilitating learning), while operational consists of functional competence (skills) and social competence (attitude and behavior) [13]. In Bloom's Taxonomy or Learning Domain, cognitive domain is for mental skills (knowledge) which includes knowledge, comprehension, application, analysis, synthesis, and evaluation. Affective is for growth in feelings or emotional areas (attitude) which includes receiving, responding, valuing and organization. And psychomotor is for the manual of physical skills (skills) which includes perception, set, guided response, mechanism, complex overt response, adaptation, and origination.

From the typology and taxonomy, work competence or work readiness consists of conceptual domains and operational domains. Conceptually the domain includes cognitive domain (knowledge), and operationally covers the affective domain (attitude) and psychomotor domain (skill). Thus, work readiness is cognitive readiness (knowledge), affective (attitude), and psychomotor (skills)

Work readiness referred to in this study includes readiness to face work in industry as a continuation of internship activities which include mental readiness, namely positive (affective) attitudes towards work in industry, intellectual abilities which include cognitive abilities (cognitive domain) and psychomotor abilities which include manual skills and intellectual skills.

The education system in Indonesia has two channels, namely formal and non-formal education channels. Both formal and non-formal education channels that are held at places of training in VTC that are directly related to the provision of professional workforce in the industry track have specific goals and objectives according to their type

and level. The goals and objectives of education have a domain or aspects that are being worked on.

VTC in accordance with their vision and mission have the same tasks as vocational education institutions on the formal path, but their goals and objectives are more specific. VTC has several activity programs, one of which is internship.

Internship is a program in a VTC that aims to improve the quality of human resources in order to create a skilled, competent and productive workforce by increasing the participation of the business world.

The relation with the problem of training objectives and targets achieved by the learning system is not different from vocational secondary education, only the emphasis is more on practical activities (skills)

Laboratory theory and practice lessons are divided into 7 levels or levels according to the level of difficulty, namely:

1. Vocational General Skills (organized basic training);
2. Vocational Basic Skills (organized basic training);
3. Work in the company for basic skills and basic skills (application of basic sides) which is carried out in the 5th to the 12th month;
4. Training at the VTC or at the company for intermediate level vocational skills (intermediate Organized training) conducted in the first quarter of the second year;
5. Work in companies for intermediate level vocational skills (application of intermediate sides) which is carried out in the second and third quarter of chess in the first year;
6. Training at the VTC at the company for the top level (specialized organized training) conducted in the first two months of the third year
7. Work at the company for the top level (specification phase of specialization)

The implementation of internship training activities is based on: 1) Law of the Republic of Indonesia No. 13 of 2003 concerning Manpower; 2) Government Regulation No. 31 of 2006 concerning the National Job Training System; 3) Minister of Manpower and Transmigration Regulation No. 5 of 2012 concerning the National Work Competency Standardization System; 4) Presidential Regulation No.8 of 2012 concerning the Indonesian National Qualification Framework.

The purpose of the vocational metal internship training is to provide skills and mental attitude or work attitude to the internship training participants with the aim of meeting the work needs in the competent metalworking industry.

This research was carried out mainly concerning internship training at the Yogyakarta VTC in the machining department carried out: 242 hours of training for turnings; 62 hours of training for milling machines; and 66 hours of training for shaping machines, namely the skill of forming workpieces with machine tools, the majority of which involve cognitive, affective and psychomotor skills.

Learning skills in the production machinery (metal machining) at the VTC involving turnings, milling and shaping machines, although emphasizing practical activities, learning strategies are not much different from learning in other vocational education institutions (formal education), that is, learning both theoretical and practical

learning. Learning theory and practice in the production machinery department includes the practice of using manual and computerized machines, along with technology that is developing and applied in the industry. In learning practice, students develop skills through exercises.

The practice of machine tools (in the production machine department) which involves turnings, scrap machines, milling machines and other machines is a way of forming workpieces of metal or nonmetal with a certain size [14].

To assist students in conducting practical exercises given knowledge and theory about the characteristics and functions of turning parts, milling and shaping machines, cutting tools, measuring tools, materials, correct work procedures and rational actions that need to be done. By mastering the theory students are expected to more easily and quickly understand and carry out practice. A student is said to have the ability of machining techniques (turning, milling, and shaping) which is adequate if he masters the theory and practice of turning. In the world of education, there are three learning objectives that include the domains: cognitive, affective, and psychomotor [15].

3. Research Method

The methods used in this study include: determining the research subject, research variables, data collection, research settings, data analysis, and triangulation

3.1. Determination of Research Subjects

The subjects in this study were determined based on a single criterion, namely the internship participants in the production machinery department at the Yogyakarta Vocational Training Center (VTC).

The number of research subjects in accordance with the above criteria were 20 students.

3.2. Variabel Research

The variables studied were work readiness which included: 1) mental readiness; and 2) intellectual readiness

3.2. Data Collection and Research Settings

Data collection techniques used in this study were theoretical tests supporting the practice of machine tools, with measuring tools in the form of objective test questions (to capture cognitive ability data), assignments to be observed for affective aspects, and process aspects as part of psychomotor processes.

Objective test questions to capture cognitive abilities were tested for the validity and reliability of the items in class II Yogyakarta VTC. Item analysis uses the difficulty index and differentiation formula. The criteria used are the magnitude of P and Q. Butir soal yang memenuhi terletak diantara 0,25-0,75 [16,17].

From the results of the calculation of the difficulty index and the different power of the theory supporting practice tests have a price range $P = 0.28 - 0.75$ and $Q = -0.10 - 0.05$.

Based on validity and reliability tests analyzed by correlation using the KR-20 formula. After calculating the correlation number $r = 0.75$ is obtained

The assignment of tasks is given as a guideline for implementation so that it can be observed about: the ability to operate machinery; use of tools; work steps; work attitude (affective aspects); work safety and time spent on completing tasks (aspects of the process).

During the research subjects carrying out machine tool practices, observations related to process aspects and affective aspects with the guidelines on the observation sheet that have been made (check list) [18,19].

Measuring the workpiece as a result of practice is intended to determine the accuracy of size, surface smoothness and appearance (product aspects). Measurement of this aspect uses the size guidelines on the elements of the workpiece in accordance with the job given at the time of practice so that the appropriateness of size.

Data was collected using tests and observations

3.3. Data Analysis

The collected data were analyzed descriptively quantitative and qualitative descriptive. At first the data collected is reduced by eliminating parts that are not relevant to the purpose of the study. Furthermore, the data is categorized by being: work ready; less ready and not ready.

3.4. Triangulation

Triangulation in this study was conducted as an effort to check the validity of the data, carried out data collection by observation and interviews.

4. Results and Discussion

After going through several stages, it can be described as follows

4.1. Work Attitude

Based on data obtained from the training department of the Yogyakarta Provincial VTC, it can be stated that the internship identification is: 3 participants came from SHS and 17 participants came from VHS. Thus, the number of internships in the Yogyakarta VTC is 20 people from the Special Region of Yogyakarta and several cities in the Central Java Province.

Seeing the educational background of the trainees, their knowledge of machining (cognitive abilities, affective abilities which are work attitudes and skills abilities or psychomotor abilities) can be stated as follows.

In general, the internship's work attitude can be stated that the average score obtained is 90.66 from the score range of 0 to 100. So, the internship's work attitude in general is very good.

In detail based on individual abilities work attitude can be stated in [Table 3](#) as follows:

Table 3. Characteristics of Internship Participants' Working Attitudes

Name	School	Work Attitude Score	Lack of work attitude
AW	VHS	93,33	Still lack of confidence in dealing with machines, because they still often ask for help and disturb others
SUR	SHS	93,33	Still lack of confidence in dealing with machines, because they still often ask for help and disturb others
SUS	VHS	93,33	Still lack of confidence in dealing with machines, because they still often ask for help and disturb others
HY	VHS	93,33	Still lack of confidence in dealing with machines, because they still often ask for help and disturb others
US	VHS	73,33	Still lacking confidence in dealing with machines, because they still often ask for help and disturb others, occasionally still working in a dangerous way, occasionally leaving the machine in a dirty state, and occasionally still placing tools in the wrong place, not quite right, and not clean enough
AHS	VHS	93,33	Still lack of confidence in dealing with machines, because they still often ask for help and disturb others
AS	VHS	93,33	Still lack of confidence in dealing with machines, because they still often ask for help and disturb others
Y	VHS	93,33	Still lack of confidence in dealing with machines, because they still often ask for help and disturb others
SSB	VHS	93,33	Still lack of confidence in dealing with machines, because they still often ask for help and disturb others
MA	VHS	93,33	Still lack of confidence in dealing with machines, because they still often ask for help and disturb others
AK	SHS	93,33	Still lack of confidence in dealing with machines, because they still often ask for help and disturb others
FR	VHS	93,33	Still lack of confidence in dealing with machines, because they still often ask for help and disturb others
BS	VHS	93,33	Still lack of confidence in dealing with machines, because they still often ask for help and disturb others
SUM	VHS	80	Still lack of confidence in dealing with machines, because they still often ask for help and disturb others, occasionally still working in a dangerous way, occasionally leaving the machine dirty
SZ	VHS	93,33	Still lack of confidence in dealing with machines, because they still often ask for help and disturb others
TS	VHS	86,66	Still lack of confidence in dealing with machines, because they still often ask for help and disturb others, occasionally still working in a dangerous way, occasionally leaving the machine dirty
JA	VHS	93,33	Still lack of confidence in dealing with machines, because they still often ask for help and disturb others
ICH	VHS	93,33	Still lack of confidence in dealing with machines, because they still often ask for help and disturb others
PW	VHS	93,33	Still lack of confidence in dealing with machines, because they still often ask for help and disturb others
AH	SHS	80	Still lack of confidence in dealing with machines, because they still often ask for help and disturb others, occasionally still working in a dangerous way, occasionally leaving the machine dirty

4.2. Intellectual Readiness

Intellectual readiness in this study includes cognitive abilities and intellectual skills expressed in work by operating machine tools or production machines. From the data the two capabilities can be described as follows

4.2.1. Cognitive Ability

As stated in the literature review that the ability of theory to support practice (cognitive ability) is the main

capital for someone in learning turning machining techniques. Therefore, in this study the cognitive abilities of research subjects are a part that must be revealed.

Cognitive ability is measured by an objective test, with the measurement results obtained the lowest score of 39 and the highest score of 83 with a mean score of 65. There are 6 internships who score below 60, 11 between 61-80 and 11 over those with 80 3 people.

In detail the trainees' cognitive abilities can be described in [Table 4](#) as follows:

Table 4. Characteristics of the Internship Participants' Cognitive Abilities

Name	School	Cognitive Ability Score	Topic of questions that cannot be answered
AW	VHS	61	Cross-turning, finishing turning process, chisel shape and thread turning
SUR	SHS	39	Tool position, machine speed, tool shape, turning process, thread
SUS	VHS	65	Chisel shape, turning process, threaded
HY	VHS	56	Turning process, cutting speed, threaded
US	VHS	83	Turning transversely, finishing turning process, thick cuts
AHS	VHS	65	Chisel shape, turning process, threaded
AS	VHS	56	Turning process, tool position, threaded
Y	VHS	56	Chisel shape, turning process, tool position, threaded
SSB	VHS	56	Chisel shape, turning process, tool position, threaded
MA	VHS	74	Chisel shape, turning process
AK	SHS	61	Cross-turning, finishing turning process, chisel shape, turning thread
FR	VHS	74	Chisel shape, turning process, tool position
BS	VHS	65	Chisel shape, turning process, threaded
SUM	VHS	83	Transverse turning, chisel position, chisel shape, turning thread
SZ	VHS	83	Transverse turning, chisel positioning, thread turning, milling machine working principle
TS	VHS	65	Chisel shape, turning process, threaded
JA	VHS	74	Transverse turning, chisel shape, turning process, working principle of milling machine, working principle of shaping machine
ICH	VHS	43	Tool position, machine speed, tool shape, turning process, thread, shaping machine function
PW	VHS	74	Transverse turning, chisel shape, turning process, working principle of milling machine, working principle of shaping machine
AH	SHS	74	Chisel shape, turning process, turning thread

4.3. Psychomotor Ability

Measurement of psychomotor abilities in machine tool practices in this study was taken by measuring the results of the internship participants' practice results, of the 20 internships obtained an average score of 90.5 with the lowest score range of 67 and the highest score of 97.

There are 4 internships whose scores are below the mean score obtained by the group, namely 2 people get a score of 67 and 2 people get a score of 88. Internships who get a score of 67 madih have difficulty or do not have the work readiness in turning across or measuring the elongated workpiece along the main axis of the turning (average failing in turning on this element)

4.4. Discussion of Mental Attitude or Work Attitude, Cognitive Abilities, Psychomotor Abilities

Based on the descriptive results data above, a number of things can be stated as follows

4.4.1. Mental Attitude or Work Attitude

Based on the mental attitude of the trainees with a mean score of 90.66 can be said to be very good. In other words, the mental attitude of the interns in dealing with work is very ready. Individually there are only or found mental attitudes like the following Table 5:

Table 5. Work Attitude Category

Internship Participants	Score	Category
4	73,33	Less Ready to Work
16	93,33	Very Ready to Work

Thus, it can be said that the percentage of mental attitude ready for work as shown in Figure 1 below.

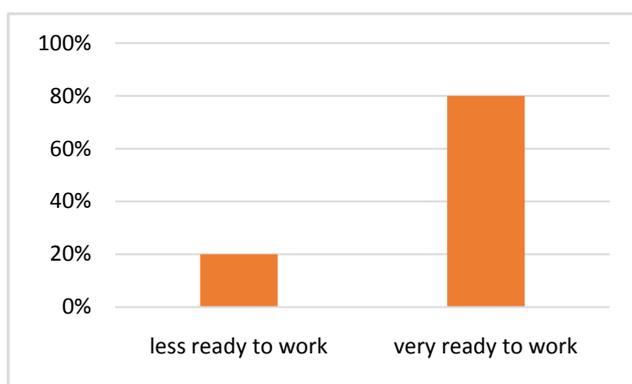


Figure 1. Percentage of Mental Attitudes of Internship Participants Ready to Work

4.4.2. Cognitive Ability

Based on the cognitive abilities of the trainees reaching an average of 63.35, it can be said to be sufficient to prepare themselves as skilled workers who have adequate knowledge so as to be able to anticipate types of work with varying degrees of difficulty. However, if viewed individually or by group, it can be stated as in Table 6 below

Table 6. Cognitive Abilities Category

Internship Participants	Score	Category
6	< 60	Less Ready to Work
6	60 – 70	Quite Ready to Work
8	> 70	Very Ready to Work

Thus, it can be said in the achievement of the cognitive aspects of 20 internships such as Figure 2 below

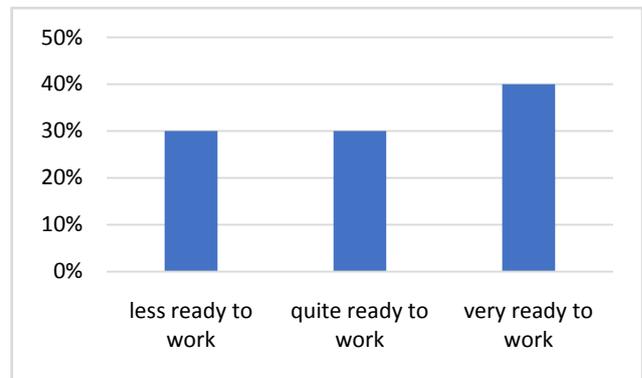


Figure 2. Percentage of Cognitive Abilities of Internship Participants Ready to Work

4.4.3. Psychomotor Ability

Based on the research data, both the process aspects and the product aspects of the psychomotor ability of the research subjects (internship participants) as a group can be said to be very ready, given the group average score of 90.5. When seen in detail as the following Table 7

Table 7. Psychomotor Abilities Category

Internship Participants	Score	Category
2	67	Quite Ready to Work
18	> 88	Very Ready to Work

Thus, it can be said that the percentage of psychomotor abilities at work readiness can be seen in Figure 3 below

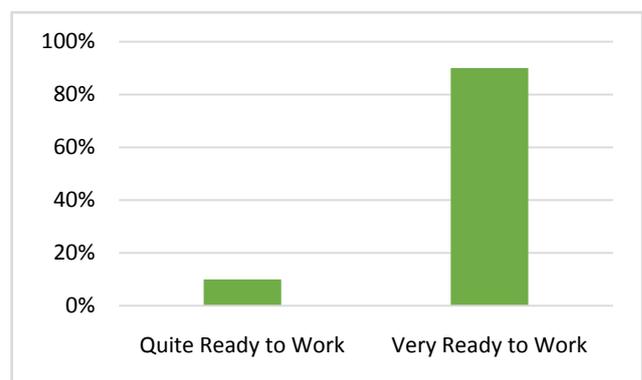


Figure 3. Percentage of Psychomotor Ability of Internship Participants Ready to Work

5. Conclusion

Based on the discussion that has been elaborated on mental readiness (attitude), intellectual readiness which includes cognitive and psychomotor aspects (skills) for internships in the production machine or machine tool

(mechanical technology) at the Yogyakarta Work Training Center, it can be concluded that: 1) there are 20% of internships having a mental attitude that is less ready to work, and 80% have a mental attitude that is very ready to work; 2) there are 30% of internships having cognitive abilities or knowledge of machineries less ready for work, 30% have cognitive abilities or knowledge of machining sufficiently ready for work, and 40% have cognitive abilities or knowledge of machineries very ready for work; 3) there are 90% of internships having psychomotor skills or abilities very ready to work and only 10% of internships having psychomotor skills or abilities are quite ready to work.

Based on the research findings that have been summarized in the conclusions above, then in machining training or teaching and learning processes carried out in each workshop or workshop whose characteristics are early heterogeneous learners (can be seen from the background of different types of schools and various different quality schools the laboratory) is a difficult job. In connection with the above, it is necessary to design worksheets, workshop briefing methods, groupings and internships in relation to participant characteristics.

References

- [1] Raillon, F., *Indonesia Tahun 2000 Tantangan Industri dan Teknologi*, CV Haji Masagung, Jakarta, 1990.
- [2] Devore, P.W., *Technology, An Introduction*, Davis Publications Inc, U.S, 1980.
- [3] Toffler, A., *Powershift: Knowledge, Wealth, and Violence at the Edge of the 21st Century*, Bantam Books, New York, 1991.
- [4] Boedinono, S., *Pengaruh Pergeseran Struktural Terhadap Pendidikan dan Ketenagakerjaan dalam periode tinggal landas di Indonesia*, Pusat Informatika Balitbang Depdikbud, Jakarta, 1991.
- [5] World Economic Forum, *ASEAN Youth Technology, Skills and the Future Work*, Geneva, Switzerland, 2019.
- [6] Torun, H., Tumen, S., *Do Vocational High School Graduates Have Better Employment Outcomes than General High School Graduates?*, IZA Institute of Labor Economics, Schaumburg, Germany, 2017.
- [7] Mahirda, K., Wahyuni, H., *Returning to General and Vocational High School in Indonesia*, De Gruyter Open, Review of Economic & Business Studies, Volume 9, Issue 2, 2016.
- [8] Moses, K.M, Muladi, Wibawa, A. P, *The Linkage Vocational Schools and Industries Cooperation a comparison in Developed and Developing Countries*, International Conference on Education, Universitas Negeri Malang, 2016.
- [9] Said, U., Yuswadi, H., Toha, A., Puspitaningtyas, Z., *Contribution of Vocational High School in Improving the Quality of Human Resources and the Partiality of Government*, International Journal of Current Research, Vol. 9, Issue 11, 2017.
- [10] Zulkabir, *Kesenjangan Okupasional: Kasus di Jawa Barat*, IKIP Bandung, Bandung, 1990
- [11] Republic of Indonesia, *Regulation of the Minister of Manpower and Transmigration Number 8 about Competency Based Training Management Guidelines*, Jakarta, 2014.
- [12] Spill, R., *A Systems Approach to Youth Employment Competencies*, The Administration, University of Illinois Library, 1986.
- [13] Winterton, et al., *Typology of Knowledge, Skills And Competences: Clarification of the concept and prototype*, Cedefop, Luxembourg, 2006.
- [14] Walker, J.R., *Machining Fundamentals Basic to Industry*, Illinois: The Goodheart-Willcox Company Inc, South Holland, 1981.
- [15] Bloom, B.S., *Taxonomy of Educational Objective, Book 1 Cognitive Domain, Book 2 Affective Domain*, London: Logman Group Ltd, London, 1979.
- [16] Fernandes, H.J.X, *Testing and measurement*. Jakarta: National Education, Planing, Evaluation and Curriculum Development, Jakarta, 1984.
- [17] Fernandes, H.J.X, *Evaluation of educational programs*. National Education, Planing, Evaluation and Cultural Development, Jakarta, 1984.
- [18] Lane, S., Raymond, M.R., Haladyna, T.M, *Handbook of Test Development 2nd Edition*, Routledge, New York, 2016.
- [19] Haladyna, T.M., Rodriguez, M.C., *Developing and Validating Test Items*, Routledge, New York, 2013.

