The influence of industrial work practices and workshop infrastructure facilities on work readiness of students

M R A Setyadi¹, M B Triyono², and R W Daryono¹

¹Graduate Program of Technological and Vocational Education, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia
²Department of Mechanical Engineering Education, Faculty of Engineering, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia

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

Abstract. This study aims to determine the influence of industrial work practice and workshop facilities on work readiness in class XI mechanical engineering. The research subjects were 101 students of class XI mechanical engineering, using the ex post facto research method using statistical analysis using the SPSS program. The results of the study are as follows: (1) Industrial work practices have a positive effect on job readiness with a significance of 0.000, a determination coefficient of 30% has an effect; (2) Workshop infrastructure has a positive influence on work readiness with a significance value of 0.000, 28.6% determination efficiency has an effect; (3) Industrial work practices and infrastructure together have an influence on job readiness indicated by a significance value of 0.000 having a coefficient of determination 58.6% in influencing job readiness.

1. Introduction

Industrial Work Practice is a form of professional expertise education that combines systematically and synchronously educational programs in schools and skills mastery programs obtained through direct work activities in the world of work [1, 2], aimed at providing self-development for students to work in the industry [3] and equip student competencies according to industry needs [4, 5]. Industrial work practices provide and at the same time teach students [6] about and how life in the world of work in addition to testing the knowledge he has learned [7], in the world of work, many things that must be prepared, one of which is work readiness because many students have already through it. Doing internship only gets a little information about the work they have [8] so that this will result in many vocational graduate students not being accommodated in the world of work because they are not mature in work [9]. This is not in line with the goals of vocational education to educate and produce graduates who have the competencies needed by industry [10-12].

In implementing this industrial work practice, it is hoped that every student will be able to participate in work activities and understand work activities carried out in the business world or in the industrial world so that these students can achieve and get something good and useful for themselves and so that these students can to show their maximum performance which he has done while in the business or industrial world so that he is able to make himself counted in the business world or the industrial world. The industrial practice provides and at the same time teaches students about and how life in the world of work in addition to testing the knowledge they learn through industrial practice.
students are expected to be able to understand how the rules and regulations in the industrial/business world, so that when they graduate they are truly ready to work both scientifically and mentally.

The condition of practical facilities and infrastructure in schools is one of the supporting careers of junior high school students in training skills [13]. Educational facilities are all sets of equipment, materials, and furniture that are directly used in the educational process in schools, in relation to this educational infrastructure is all basic equipment which indirectly implies the implementation of the educational process in schools, basically, all tools and equipment are supporting facilities in the learning process at school. Infrastructure facilities also need attention to improve student work readiness, the role of industry in cooperation is not only to channel graduates but can work together to help support infrastructure in schools, can be done in collaboration with the teaching factory program so as to support the rejuvenation of practical infrastructure specifically [14-15].

In the world of work, there are so many things that must be prepared, one of which is work readiness, many students who have done industrial practice only get a little information about the jobs they have, the efforts made to find jobs and career planning are not mature so that it will result in many student graduates vocational education is not accommodated in the world of work because the industrial world requires personnel who are mature and ready to work. In this case, vocational education plays an important role in educating students so that they can become skilled, creative, and ready to work students. Work readiness is a person's ability to complete work in accordance with the provisions without experiencing difficulties and obstacles with maximum results and according to the predetermined targets. In this condition, student work-readiness shows the harmony between physical maturity, mental maturity, and learning experience so that individuals have the ability to carry out an activity or certain behavior in a working relationship.

After making preliminary observations there are students who after carrying out internships find it difficult to find work due to lack of student competence and inadequate career planning because the facilities and infrastructure are not fully supported due to many using equipment that does not comply with Standard Operational Procedures. In addition, the competence of students is not ready to carry out work in the industry, the rules that are applied in the workplace [16]. Based on these problems, research was carried out on the impact of industrial work practices and workshop infrastructure facilities on work readiness of class XI mechanical engineering at SMKN 1 Semarang.

2. Methods

This research is an ex post facto study using quantitative data. The research subjects consisted of 4 mechanical engineering classes with a total of 101 research subjects with the mechanical engineering study program at SMKN 1 Semarang. The respondents are shown in Table 1.

| No | Class XII                                      | Respondents |
|----|-----------------------------------------------|-------------|
| 1  | Department of Mechanical Engineering A        | 26          |
| 2  | Department of Mechanical Engineering B        | 26          |
| 3  | Department of Mechanical Engineering C        | 26          |
| 4  | Department of Mechanical Engineering D        | 23          |
|    | Jumlah                                        | 101         |

The results of these trials were used to determine the validity and reliability of the instrument [17]. This research instrument uses a questionnaire with a Likert measurement scale with four answer choices. The process of data analysis in this study used quantitative descriptive analysis with percentages to provide a description of each variable obtained in this study. Table 2 is an explanation of the questionnaire scoring categories.
Table 2. Questionnaire scoring

| Classification   | Description                                                                 | Score |
|------------------|-----------------------------------------------------------------------------|-------|
| Strongly agree   | Respondents strongly agree with the question points in the questionnaire     | 4     |
| Agree            | Respondents agree with the question points on the questionnaire             | 3     |
| Disagree         | Respondents did not agree with the question points in the questionnaire     | 2     |
| Strongly disagree| Respondents did not agree with the question points on the questionnaire     | 1     |

3. Results and discussion

Research instruments before use must meet the prerequisite tests for validity and reliability. To determine the validity and reliability of the instrument, a trial was conducted first. In the question item for the variable industrial work practice (X1) and the Infrastructure workshop (X2), the test method compares the calculated r value with r table at the 5% significance level, for N = 20, so that the r table value is 0.444 to see the calculation results and decision item decision for variable industrial work practices (X1) and Infrastructure workshop, below is a summary in the form of a test table for the validity of the questions show in table 3.

Table 3. Summary of the Validity Test

| questionnaire items | r value (X1) | r value (X2) | r table | Category |
|---------------------|-------------|-------------|---------|----------|
| items 1             | 0.447       | 0.835       | 0.444   | Valid    |
| items 2             | 0.549       | 0.641       | 0.444   | Valid    |
| items 3             | 0.600       | 0.529       | 0.444   | Valid    |
| items 4             | 0.536       | 0.521       | 0.444   | Valid    |
| items 5             | 0.732       | 0.541       | 0.444   | Valid    |
| items 6             | 0.651       | 0.557       | 0.444   | Valid    |
| items 7             | 0.592       | 0.556       | 0.444   | Valid    |
| items 8             | 0.643       | 0.672       | 0.444   | Valid    |
| items 9             | 0.725       | 0.556       | 0.444   | Valid    |
| items 10            | 0.828       | 0.570       | 0.444   | Valid    |
| items 11            | 0.691       | 0.487       | 0.444   | Valid    |
| items 12            | 0.703       | 0.524       | 0.444   | Valid    |
| items 13            | 0.827       | 0.546       | 0.444   | Valid    |
| items 14            | 0.661       | 0.612       | 0.444   | Valid    |
| items 15            | 0.623       | 0.471       | 0.444   | Valid    |
| items 16            | 0.447       | 0.835       | 0.444   | Valid    |
| items 17            | 0.549       | 0.641       | 0.444   | Valid    |
| items 18            | 0.600       | 0.529       | 0.444   | Valid    |
| items 19            | 0.536       | 0.521       | 0.444   | Valid    |
| items 20            | 0.732       | 0.541       | 0.444   | Valid    |

Reliability testing of the question items variable industrial work practice (X1) and the Infrastructure workshop (X2), namely Cronbach Alpha > minimum criteria, while the minimum criteria in the table with N = 20 for 5% significance obtained a minimum criterion value of 0.70. The following summary results are shown in the table 4.
Table 4. Reliability Test Analysis Results

| Research variable             | Cronbach’s Aplha | minimum criteria | Category |
|------------------------------|------------------|------------------|----------|
| Industrial Work Practice     | 0.897            | 0.70             | reliable |
| Infrastructure advice        | 0.843            | 0.70             | reliable |

3.1 Descriptive Analysis of Variable Industrial Work Practices, Facilities, and Work Readiness
To find out how the response or answer from distributing questionnaires to a number of 101 students of SMK N 1 Semarang for each variable. The data from this study consisted of two independent variables, namely the Industrial Work Practices ($X_1$) and Infrastructure ($X_2$) variables and one dependent variable, namely Work Readiness ($Y$). In this section, the results of the research data for each variable that have been processed will be explained or described in terms of the mean, median, mode, and standard deviation values. In addition, a frequency distribution table and a bar chart of the distribution of the score tendency will also be presented. The results of the descriptive analysis using the frequency distribution are shown in Table 5.

Table 5. Descriptive Analysis

| Research variable                      | Frequency | Percentage | Category |
|----------------------------------------|-----------|------------|----------|
| Industrial Work Practices               | 80        | 79.2 %     | Very good|
| Infrastructure advice                   | 88        | 87.1 %     | Very good|
| Industrial Work Practices and Infrastructure | 101      | 100 %      | Very good|

Based on the frequency distribution data, the value of each variable is obtained. Industrial work practice is 79.2% with a very good category, infrastructure facilities are 87.1% very good category, and industrial work practices and infrastructure facilities show 100% of the summary results of frequency data distribution. Here, Based on these data, information is obtained that students who have carried out industrial work practices in very good condition and the variables of facilities and infrastructure obtain data that show that they are in very good condition. condition when the industrial work practice variables with infrastructure simultaneously get information data that shows this. It is in great shape.

3.2. Hypothesis testing
Hypothesis testing in this study was carried out using two methods, namely the t-test and f test. The t-test is used to test the effect of industrial work practices on job readiness, the effect of workshop infrastructure on work readiness, the effect of industrial work practices, and workshop infrastructure on work readiness based on the t value. The F test is used to test the effect of industrial work practice variables ($X_1$) and workshop facilities ($X_2$) on job readiness ($Y$). The results of the t test are shown in Table 6 and the results of the f test of industrial work practices ($X_1$) and workshop infrastructure facilities ($X_2$) on work readiness ($Y$) is shown in Table 7.

Table 6. The results of the t test

| Model | Unstandardized Coefficients B | Standardized Coefficients Beta | t       | Sig.    |
|-------|-------------------------------|-------------------------------|---------|---------|
|       |                               |                               |         |         |
| 1     |                               |                               |         |         |
| (Constant) | 38.665 | 2.440                           | 15.847  | .000    |
| Industrial Work Practices ($X_1$) | .305       | .046                           | .554    | 6.617   | .000    |
| 2     |                               |                               |         |         |
| (Constant) | 39.637 | 2.367                           | 16.744  | .000    |
| Workshop Facilities ($X_2$) | .283       | .044                           | .542    | 6.411   | .000    |

The Industrial Work Practices variable ($X_1$) shows the t value of 6.617 and the significance value of 0.000 <0.05 with Df = N-2 of 99 so that the t table is 1.980, then t count (6.617) > t table (1.980)
states that Ha is accepted. So the hypothesis which states "There is an effect of industrial work practices (X_1) on job readiness (Y) at SMKN 1 Semarang" is accepted. The variable of Workshop Facilities (X_2) results of the calculation of the table above shows the t value of 6.411 and the significance value of 0.000 <0.05 so that t table is 1.980, then t count (6.411) > t table (1.980) is stated that Ha accepted. So the hypothesis which states "There is an impact of workshop infrastructure (X_2) on work readiness (Y) class XI TKR at SMKN 1 Semarang" is accepted. The results of the f test of industrial work practices (X_1) and workshop infrastructure (X_2) on work readiness (Y) is shown in Table 7.

Table 7. The results of the f test of industrial work practices (X_1) and workshop infrastructure (X_2) on work readiness (Y)

| Model       | Sum of Squares | df  | Mean Square     | F       | Sig.  |
|-------------|----------------|-----|-----------------|---------|-------|
| Regression  | 395.340        | 2   | 197.670         | 59.066  | .000  |
| Residual    | 327.967        | 98  | 3.347           |         |       |
| Total       | 723.307        | 100 |                 |         |       |

a. Dependent Variable: working readiness
b. Predictors: (Constant), Industrial Work Practices variable (X_1), Workshop Facilities (X_2)

Based on the calculation table 7, it shows that F-count = 59.066 and the significance value of F is 0.000 <0.05. By using DF1 = 2 and DF = 98 (101-2-1) the F table value is 3.09. From these results the F-count value is 59.066> the F table value is 3.09. This result shows that F-count is significant so that Ha can be accepted. Based on these results, the hypothesis Ha3 states "There is an effect of industrial work practices (X_1) and workshop facilities (X_2) on work readiness (Y) of XI TKR students at SMKN 1 Semarang".

Table 8. Determination test

| Model       | R       | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin_Watson |
|-------------|---------|----------|-------------------|----------------------------|---------------|
| 1           | .739    | .547     | .537              | 1.829                      | 1.966         |

a. Dependent Variable: working readiness
b. Predictors: (Constant), Industrial Work Practices variable (X_1), Workshop Facilities (X_2)

Based on Table 8, it is obtained Adjusted R Square of 0.547, this shows that the variable influence of industrial work practices and workshop infrastructure both affects the work readiness variable by 54.7% and the remaining 45.3% is influenced by other variables not examined in this study.

3.3. Discussion

Based on the results of the analysis conducted by researchers regarding the effect of industrial work practices (X_1), students of class XI showed that from 101 respondents it was known that 80 respondents (79.2%) had a very good category, 20 respondents (19.8%) had a good category, 1 respondent (1.0%) was in a bad category and 0 respondents (0%) had a bad category. The results of the analysis conducted by the researcher regarding the workshop facilities (X_2), the students of class XI showed that from 101 respondents it was known that 88 respondents (87.1%) had a very good category, 12 respondents (11.9%) had a good category, 1 respondent (1.0%) was in a poor category and 0 respondents (0%) had a bad category. The results of the analysis conducted by researchers regarding job readiness (Y) of class XI students showed that from 101 respondents it was known that 101 respondents (100%) had a very good category.

The results of the hypothesis test (t-test) show that the effect of industrial work practices and workshop infrastructure on work readiness of class XI TKR SMKN 1 Semarang students because industrial work practices have a calculation result that shows the value of t count (6.617) > t table (1.980) is stated that Ha accepted. So that the conclusion of the hypothesis states "there is a positive influence on industrial work practices (X_1) on job readiness (Y) in class XI TKR at SMKN 1
Semarang”. Meanwhile, workshop facilities have a calculation result that shows the value of t count (6.411) > t table (1.980), it is stated that Ha is accepted. So that the conclusion of the hypothesis states "there is a positive effect of workshop infrastructure (X2) on work readiness (Y) class XI TKR at SMKN 1 Semarang". So it can be concluded that the t-test states that there is an effect of industrial work practices on work readiness and workshop infrastructure on work readiness of class XI TKR SMKN 1 Semarang students.

The simultaneous hypothesis test results show that there is an effect simultaneously because the ANOVA test or F test shows that the F count value is 59.066 > the F table value of 3.09. This result shows that F count is significant so that Ha can be accepted. Based on these results, the hypothesis Ha states "there is a positive effect of industrial work practices (X1) and workshop facilities (X2) on work readiness (Y) TKR students at SMKN 1 Semarang” is accepted. While the determination hypothesis test which states that the work-readiness variable is influenced by the industrial work practice variable and the workshop infrastructure variable is calculated using the SPSS for Windows Release 20.0 program, it is known that the adjusted R Square value is 0.547, it shows that the variable influence of industrial work practices and workshop infrastructure is equally affects the work readiness variable by 58.6% and the remaining 41.4% is influenced by other variables not examined in this study.

The results of this study are consistent with the results of research by Rofiq [18] which aims to determine the effect of work knowledge and industrial practice experience on learning motivation with the results of the study showing no positive and significant influence between work knowledge and learning motivation, between students’ industrial practice experience and motivation to learn. Further research by Saputro [19] aims to determine the effect of industrial work practices and student work-readiness competencies of SMKN 1 Sedayu students with the results of the research showing that industrial work practice achievement is high (77.8%), student competence is high (79.6%) and students’ job readiness is also in the high category (79.4%). Industrial work practice has a positive and significant effect on student work-readiness. Student competence has a positive and significant effect on student work readiness and industrial work practices and student competence has a positive and significant effect on student work readiness.

4. Conclusion

Based on the results of the research and discussion above, it can be concluded that the experience of industrial work practices and infrastructure partially simultaneous effects the work readiness level of class XI students at SMK Negeri 1 Semarang. Therefore, the school in increasing cooperation with industry in preparing students to carry out industrial work practices will be more organized and the need for collaboration with industry.

To support success at SMKN 1 Semarang in all its activities, the authors put forward some suggestions that might be useful for schools, namely industrial work practices at SMKN 1 Semarang are good enough to increase work readiness, but it would be nice for industrial work practices to be improved so that students are more mature to motivate readiness to work after graduating from school. Workshop infrastructure at SMKN 1 Semarang is good enough to improve work readiness, but for better workshop facilities, especially measuring instruments, need to be replaced and improved in quality so that students can learn more about measuring tools so that work readiness can also be improved even more. Work readiness at SMKN 1 Semarang is very good, so the school must be able to maintain student work-readiness until the next academic year. It is hoped that teachers can guide students even better and are expected to accompany and teachers can become friends for their students so that students are more comfortable in carrying out the learning process and students can capture lessons more optimally.
5. References

[1] Triyono M B, Trianingsih L, and Nurhadi D 2018 Students’ employability skills for construction drawing engineering in Indonesia World Transactions on Engineering and Technology Education (16) 1 p 29-35 http://www.wiete.com.au/journals/WTE&TE/Pages/TOC_V16N1.html

[2] Sukardi T, Fitrah A, Syauqi K, and Paryanto 2020 Industrial working culture in learning practice at vocational high school Journal of Physics: Conference Series, 1446 (012010) https://doi.org/10.1088/1742-6596/1446/1/012010

[3] Oviawe J I, Uwameiye R, and Uddin P S O 2017 Bridging skill gap to meet technical, vocational education and training school-workplace collaboration in the 21st century International Journal of Vocational Education and Training Research 3(1) pp 7-14 https://doi.org/10.11648/j.ijvetr.20170301.12

[4] Sugiyanto S, Setiawan A, Hamidah I 2020 Integration of Mobile Learning and Project-Based Learning in Improving Vocational School Competence Journal of Technical Education and Training 12(2) pp 55-68 https://publisher.uthm.edu.my/ojs/index.php/JTET/article/view/5470

[5] Suroto and Hung N T 2018 Management of an Industry Standard Class in Vocational High Schools Jurnal Pendidikan Teknologi dan Kejuruan 24(1) p 46-51 https://doi.org/10.21831/jptk.v24i1.14710

[6] Daryono R W, Yolando A P, Jaedun A, and Hidayat N 2020 Competency of vocational schools required by construction industry in consultants’ supervisor Journal of Physics: Conference Series, 1456 (012057) https://doi.org/10.1088/1742-6596/1456/1/012057

[7] Laguado R I, Florez E G, and Hernández F Y 2018 Motivation and performance of students of an engineering program in the realization of industrial practices Journal of Physics: Conference Series, 1126 (012043) https://doi.org/10.1088/1742-6596/1126/1/012043

[8] Fakhri A A and Munadi S 2019 The Evaluation of Industrial Internship for Vocational School of Mechanical Engineering in Tegal American Journal of Educational Research 7(11) https://doi.org/10.12691/education-7-11-8

[9] Ismail M E, Hashim S, Zakaria A F, Ariffin A, Amiruddin M H, Rahim M B, Razali N, Ismail I M, and Sa’adan N 2018 Gender Analysis of Work Readiness Among Vocational Students: A Case Study Journal of Technical Education and Training 12(1) https://publisher.uthm.edu.my/ojs/index.php/JTET/article/view/3106

[10] Sudjimat D A and Permadi L C 2019 Effect of Work-Based Learning Model on Students’ Achievement Motivation Jurnal Pendidikan Teknologi dan Kejuruan 25(2) p 204-212 https://doi.org/10.21831/jptk.v25i2.24416

[11] Diwangkoro E and Soenarto 2020 Development of teaching factory learning models in vocational schools ICTVT 2019 Journal of Physics: Conference Series, IOP Publishing, 1456 (012046) https://doi.org/10.1088/1742-6596/1456/1/012046

[12] Indiana L and Soenarto 2019 Vocational Career Center as the Bridge Between Industry and Vocational High School Graduates Jurnal Pendidikan Teknologi dan Kejuruan 25(2) p 219-228 https://doi.org/10.21831/jptk.v25i2.19817

[13] Ismail A A and Hassan R 2019 Technical Competencies in Digital Technology Towards Industrial Revolution 4.0 Journal of Technical Education and Training 11(3) https://publisher.uthm.edu.my/ojs/index.php/JTET/article/view/3208

[14] Friadi J 2020 Needs Analysis of Development of Product-Based Learning Models With Teaching Factory Approach International Journal of Advanced Science and Technology 29(7) pp 3030-3038 http://sersc.org/journals/index.php/IJAST/article/view/18929

[15] Cholik M and Soeryanto 2020 Model Teaching Factory Based Local Advantages in SMK International Journal of Advanced Science and Technology 29(05) pp 1279-1286 http://sersc.org/journals/index.php/IJAST/article/view/9791
[16] Wibisono G, Wijanarka B S, and Theophile H 2020 The Link and Match Between the Competency of Vocational High Schools Graduates and The Industry on CAD/CAM and CNC Jurnal Pendidikan Teknologi dan Kejuruan 26(1) pp 26-334 https://doi.org/10.21831/jptk.v26i1.27932

[17] Sugiyono 2019 Metode Penelitian Kuantitatif, Kualitatif, dan R&D (Alfabeta: Bandung)

[18] Rofiq Z, Prananda Y, and Syauqi K 2020 The influence of work knowledge and industrial practice experience to learning motivation Journal of Physics: Conference Series, 1446 (012020) https://doi.org/10.1088/1742-6596/1446/1/012020

[19] Saputro A E and Sugiyono 2019 The Effects of Industrial Working Practices and Student Competencies on Work Readiness of Students in SMKN 1Sedayu Journal of Physics: Conference Series, 1273 (012026) https://doi.org/10.1088/1742-6596/1273/1/012026