

Exploring the role of industry in vocational education: A quantitative study of work-based learning competencies

Ardani Ahsanul Fakhri ^{a*}, Yogyakarta State University, Jl. Colombo No. 1, Sleman 55281, Indonesia, <https://orcid.org/0000-0002-0372-4050>

Putu Sudira ^b, Yogyakarta State University, Jl. Colombo No. 1, Sleman 55281, Indonesia, <https://orcid.org/0000-0003-2646-6741>

Pardjono ^c, Yogyakarta State University, Jl. Colombo No. 1, Sleman 55281, Indonesia, <https://orcid.org/0000-0003-3992-350X>

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Abstract

Vocational education is an educational institution that prepares its graduates to be ready for work, through work-based learning. The implementation of work-based learning requires a very good role from the industry. Therefore, this research intended to explore the role of industry in work-based learning. This research was conducted using a descriptive quantitative method. The data collection was carried out with a questionnaire that contained five elements to explore the role of industry in work-based learning. Data processing was carried out using statistical software to display the mean and standard deviation of the data results, then categorization was carried out to describe the role of the industry. The results of the research through the exploration of the five elements show that the role of industry in work-based learning is in the very good category for each element. This study was necessary, considering the industry is an important component in the implementation of work-based learning.

Keywords: work-based learning, vocational, quantitative, Role of Industry

* ADDRESS FOR CORRESPONDENCE: Ardani Ahsanul Fakhri, Yogyakarta State University, Jl. Colombo No. 1, Sleman 55281, Indonesia.

Email: ardaniahsanulfakhri@uny.ac.id

1. Introduction

Vocational education is an educational institution whose learning process is organized by the government to produce a skilled workforce (Handayati et al., 2020). Vocational education is part of vocational education which has the same implementation objective, namely to prepare graduates to work in certain competency areas (Indonesia, 2003). Efforts should be made to prepare graduates to be able and ready to work in certain competency fields, by building competence relevant to the world of work related to existing competencies, so that the competency provisions possessed by students follow what is needed by the industry (López & López, 2020; Khuluqo & Istaryatiningtias 2022).

The Government of Indonesia is pursuing the goals of vocational education by making three policies related to vocational education. The first policy is Presidential Instruction No. 9 of 2016 concerning the Revitalization of Vocational High Schools in the Context of Improving the Quality and Competitiveness of Indonesian Human Resources. The second policy is Revitalization of Vocational Education by the Ministry of Education and Culture in 2016 which contains six urgencies for Vocational Education including Amanah Nawacita and SDGs 2030, Fulfillment of 58 Million Skilled Workers by 2030, Competition at the Regional and Global Levels, Preparing for the 2045 Golden generation, Improvement of the Workforce Structure Work, and Quality Improvement, Relevance, and Efficiency (Culture, 2016). The third policy is the 10 Steps to implementing Vocational Education revitalization which contains Revitalization of Human Resources, Building a School Administration System based on Management Information Systems, Linking and matching with the World of Work, Industry-Based Curriculum, Teaching Factory, Use of Media on e-Report Skills, Test Professional certification, fulfillment of infrastructure, development of local wisdom, and the role of Vocational High School as an economic driver (Sampun et al., 2017).

Continuing these efforts, the Government of Indonesia made a policy regarding the Center of Excellence Vocational High School as stipulated in the Decree of the Minister of Education, Culture, Research and Technology of the Republic of Indonesia number 165/M/2021 concerning the Center of Excellence Vocational High School Program. This program has the aim of strengthening partnerships and cooperation between the Ministry of Education, Culture, Research, and Technology and the world of work in the development and mentoring of the Center for Excellence Vocational High School Program (Decree of the Minister of Education, Culture, Research and Technology of the Republic of Indonesia Concerning the Center for Excellence Vocational High School Program, 2021).

The implementation of the VHS-CoE (Vocational High School-Center of Excellence) program does not only refer to increasing cooperation between the world of work and educational institutions in terms of infrastructure but also to improving the quality of learning, referring to empowering school components as learning organizations based on the main tasks and functions of each in the program structure. The learning carried out in this program refers to the VHS-CoE program guidelines, namely in the form of apprenticeship programs and *Teaching Factory*. The implementation of apprenticeships is not only limited to ordinary apprenticeships but requires a learning strategy. Learning strategies that are usually used are cooperative, contextual, case studies, discussions, realistic, and problem-based learning which in this case uses work-based learning strategies (Irwanto, 2020). Work-based learning (WBL) has become a subject of intense discussion in various Vocational Education provider countries in the last decade (Bergseng et al., 2019). work-based learning in student internship programs has a positive impact on apprentices. By participating in an internship program, students get hands-on experience so they can relate the competencies they acquire at school to those in the industry (Sutiman et al., 2022).

Work-based learning helps students master the competencies they get at school and also experience the work culture in the industry firsthand (Okolie 2022). Student understanding in work-based learning is higher than learning with other methods (Ismail et al., 2015). The work-based learning strategy is also appropriate for the implementation of the VHS-CoE program which prioritizes students to gain more experience in the field (Shamzzuzoha et al., 2022). However, in its implementation, it cannot only depend on learning strategies but also the role of the industry in it (Boelens 2020). The Directorate General of Vocational Studies explained that the role of the world of work in implementing the VHS-CoE program is very important for achieving program success. Improving the Quality of Learning in Vocational High Schools is not only influenced by parents, teachers, and school principals but also by the role of collaboration and the world of work in them (Anggraeni et al., 2015; Eshuis et al., 2019).

The role of the world of work in work-based learning is expected to replace the role of the teacher as an educator. The industry is expected to be willing to prepare several things that support related learning, good communication, and providing good material will make the learning delivered achieved (Kurniadi & Muskhir, 2022; Schmid & Haukedal 2022). Sunawardhani & Casmudi, (2022) explain that the implementation of apprenticeship learning gets a low score due to obstacles from the role of the world of work which is still low. Ahmanda et al., (2022) explain that in the implementation of learning with industrial partners, it is still apparent that the number of educators from industrial partners is still low, which causes learning achievement to be low. There are still many industries that are not willing to participate in the success of learning in vocational high schools (Fatah et al., 2022).

Work-based learning (WBL)

Learning that is centered on hands-on practice in the workplace, whether in the form of apprenticeships, training, or industrial practice is the essence of work-based learning (Gray, 2014). By definition, work-based learning is a learning model that is carried out directly in the workplace using an andragogy approach (Arifin et al., 2020). Work-based learning tends to train and increase student competence in the workplace directly (Major, 2016). Work-based learning is effective in implementing and operating technology in the workplace directly as a learning tool (Chirgwin, 2021; Schmitz et al., 2023). WBL has a role in the vocational education curriculum, with the implementation of CBA students can develop careers and have a good view of job prospects (Longmore, 2011; Mordhorst & Jenert 2023). Through WBL, it can be used as a solution in anticipating very fast changes in work requirements due to the Industrial Revolution (Fürstenau et al., 2014).

Industries that are used as WBL applications, vocational education institutions, and students benefit from their implementation. The benefits obtained are in the form of developing student work competencies with the implementation of WBL. In addition to building relationships between educational institutions and industry in developing graduate careers that are tailored to work needs at that time (Bouw et al., 2019). The existence of cooperative relationships can also facilitate graduates to obtain industry certification during the implementation of the WBL, a professional network can be built to explore future jobs (Posey et al., 1988). From an industrial perspective, the implementation of WBL provides the benefits of providing potential, skilled, and highly motivated employees at work, reducing training costs, and increasing human resources. The industry has made it easier to explore prospective employees who will be recruited at work, the expertise of prospective workers who will be recruited can be seen directly with the implementation of WBL in the workplace (National Academy Foundation, 2012). In terms of educational institutions, the benefits obtained are in the form of meeting students' needs in learning, especially practical learning, student competencies relevant to industry needs, and of course improving the quality of graduates (Cedefop, 2015).

Vocational high school-center of excellence

The Merdeka Curriculum is a curriculum with various intra-curricular learning where the content will be more optimal so that students have enough time to explore concepts and strengthen competence. Teachers have the flexibility to choose various teaching tools so that learning can be adapted to the learning needs and interests of students. Projects to strengthen the achievement of Pancasila student profiles are developed based on certain themes set by the government. The project is not directed to achieve certain learning achievement targets, so it is not tied to subject content (RI, 2021). To improve the quality of human resources so that they have high competitiveness in welcoming the era of globalization, a VHS strengthening program and implementation strategy is needed so that it becomes a Center of Excellence and can influence other schools around it. In anticipating the realization of industrial revolution-based vocational education and training 4.0, the implementation of a vocational high school center of excellence refers to the Strategic Plan of the Ministry of Education and Culture 2020-2024, including; 1) opening up spaces for close cooperation with the World of Work, so that they can directly engage in informing the needs of the labor market to ensure the quality of vocational education and training programs are updated according to industry standards; 2) increasing the capacity of technical skills, soft skills, and pedagogic skills in strengthening competent human resources through vocational education and training for teachers/instructors/trainers so that they meet the standards of the World of Work; 3) developing the VHS Center of Excellence program to facilitate industry-based learning to increase human resource capacity.

Efforts to achieve the VHS Center of Excellence Program in 2022 are required: Implementation of Independent Curriculum Learning, Implementation of Link and Match, Character strengthening programs, VHS Institutional Strengthening Programs, Procurement of Practice Equipment, and Construction/Rehabilitation/Renovation/Redesign of Student Practice Spaces. Activities to strengthen world-based learning work in 2022 are; 1) Implementation of Independent Curriculum Learning, 2) Implementation of Link and Match, 3) Strengthening Character, 4) Strengthening VHS Institutions, and 5) Coordination and Reporting (Vocational, 2022).

1.1. Purpose of study

Indeed, many industries are willing to accept students in the implementation of apprenticeships, but there has been no exploration of how the support provided by the industry, lest the industry only take advantage of apprentices for the sole benefit of the industry. Therefore, in-depth exploration is needed regarding the role of industry in work-based learning in Vocational High Schools to find out more deeply about industry support. This research intended to explore the role of industry in work-based learning.

2. Materials and Method

2.1. Participants

The research was conducted using quantitative research methods, by taking sample data through instruments that were distributed to data sources. Data collection was carried out on students who carried out work-based learning. The population in the survey research was taken in the local scope where the research population is students who study in the industrial engineering field around Tegal Regency. Then the sample subjects were selected to represent the population by considering the size and representativeness of the sample. The study sample, which included 86 students, was calculated based on the calculation of the Slovin sample from a total student population of 150. The number of

student samples carrying out work-based learning was spread across 23 different machining industries according to each school's industrial partners.

2.2. Data collection instruments

The instrument was a questionnaire that consisted of 30 items using a 4-point Likert scale from '1' strongly disagree to '4' strongly agree. The distribution of instruments is given to students who carry out *work-based learning* in VHS partner industries. The instruments that have been made have gone through the process of developing research instruments, namely developing questionnaire items based on theoretical studies, testing the legibility of content validation by expert judgment, and testing the respondents to determine their validation and reliability. The instruments are grouped according to five elements and each element has indicators to find out how the industry plays a role in CPB based on the following (Fürstenau et al., 2014): 1) Knowledge; 2) Understanding; 3) Skills; 4) Attitudes; 5) Interest which is clearly shown in table 1.

Table 1

Industry role indicators in CPB

Knowledge	Provide knowledge related to specific competencies in the industry Provide knowledge related to new technologies in the industry Assists in aligning students' knowledge with industry
understanding	Assist students in understanding new industry competencies Directing students in solving problems related to industrial work Guiding students during the implementation of PBK
skills	Train students to do work in the industry Accompanying students when doing work in the industry Test students' practical skills on the job
attitude	Provide explanations to students regarding SOP Provide coaching to students regarding the 5S attitude Provide coaching to students about K3 Give sanctions to students who are not disciplined
Interest	Place students according to areas of interest and expertise Provide special work to students according to their interests and expertise

2.3. Data analysis

The results of the instrument data acquisition were then analyzed using SPSS software. Data analysis carried out included reliability analysis related to instrument data and descriptive analysis of data acquisition. Reliability is carried out to find out the feasibility of the instrument. The degree of reliability is known based on the results of tests conducted empirically. This test is carried out utilizing trials, and the data obtained is then used to conduct reliability tests. The data reliability of this study used Cronbach's alpha. The calculation is done by preparing the data to be tested for reliability in the tabulation of each respondent's answers.

Table 2

Reliability analysis

Element	Alpha Conbrach
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Knowledge	0.913
understanding	0.874
skills	0.911
attitude	0.812
Interest	0.801

The data reliability test using Cronbach's alpha shows the value of each component sequentially including Knowledge, Understanding, Skill, Attitude, and Interest, namely 0.795, 0.759, 0.788, 0.801, and 0.812 (Table 2). The use of Cronbach's Alpha for reliability testing was carried out to measure the suitability of the research instrument with the research objectives. Instrument data is declared reliable if the alpha value shows (0.70 - 0.79) and is very reliable (0.80 - 0.90). The results of the reliability test in Table 2 show that the instrument data is very reliable. After the reliability test, descriptive analysis was carried out to show how much the mean and standard deviation resulted from data collection. Data from the results of the questionnaire analysis were then categorized according to criteria to be able to assess the results of the analysis. To find out the level of these criteria, the scores obtained (in %) with descriptive analysis of percentages were consulted with the criteria table (table 3).

Table 3
percentage descriptive analysis criteria

Percentage	Criteria
75%-100%	Very good
50%-75%	Well
25%-50%	Not good
1%-25%	Very Not Good

3. Result

Exploration of the role of industry is carried out by using an instrument containing five elements with each indicator. Based on the results of the analysis of the instrument data given to students, the mean and standard deviation results for each element and its indicators were obtained. The results of the instrument data analysis on the knowledge element have the highest mean value found on the indicator providing knowledge related to specific competencies in the industry of 3.80 with a standard deviation of 0.43. The indicator Providing knowledge related to new technology in the industry and helping in aligning student knowledge with industry in the knowledge element shows a mean size of 3.70 with a standard deviation of 0.49 and 0.43 respectively. The understanding element shows the mean size sequentially on the indicator helping students understand new industrial competencies, directing students in solving problems related to industrial work and guiding students during the implementation of PBK of 3.51, 3.46, and 3.66 with standard deviations of 0.54, 0.52 and 0.66. In the Skill element the mean for the indicator trains students in doing work in industry, accompanies students when doing work in industry, and tests students' practical skills while working respectively at 3.30, 3.24, and 3.37 with standard deviations of 0.62, 0.69, and 0.69.

The Attitude element in the instrument consists of four indicators, namely giving explanations to students regarding SOPs, guiding students regarding 5R attitudes, providing guidance to students regarding K3, imposing sanctions on students who are not disciplined showing the mean values sequentially 3.58, 3.46, 3.48 and 3.32. The standard deviation for each indicator is 0.54, 0.59, 0.55, and 0.62 respectively. In the Interest element, the mean for the indicator places students according to their area of expertise, giving special work to students according to their interest in expertise, respectively

2.96 and 3.04 with a standard deviation of 0.80 and 0.72. The results of data analysis for each element and its indicators can be seen in detail in Table 4.

Table 4

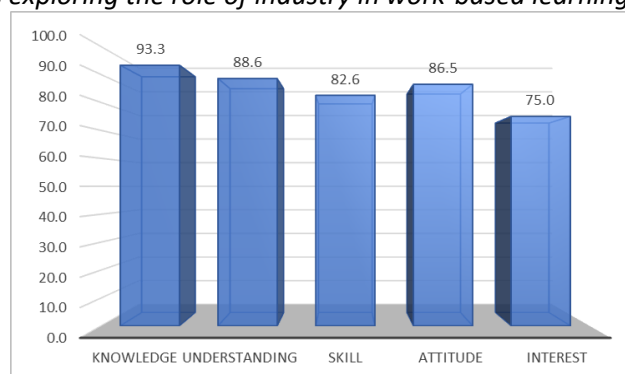
Mean data and standard deviation for each element

Element	Indicator	N	Means	std. Deviation
Knowledge	Provide knowledge related to specific competencies in the industry	86	3.80	0.43
	Provide knowledge related to new technologies in the industry	86	3.70	0.49
	Assists in aligning students' knowledge with industry	86	3.70	0.43
understanding	Assist students in understanding new industry competencies	86	3.51	0.54
	Directing students in solving problems related to industrial work	86	3.46	0.52
	Guiding students during WBL implementation	86	3.66	0.66
skills	Train students to do work in the industry	86	3.30	0.62
	Accompanying students when doing work in the industry	86	3.24	0.69
	Test students' practical skills on the job	86	3.37	0.69
attitude	Provide explanations to students regarding operational standards	86	3.58	0.54
	Provide coaching to students regarding the 5S attitude	86	3.46	0.59
	Provide coaching to students about EHS	86	3.48	0.55
	Give sanctions to students who are not disciplined	86	3.32	0.62
Interest	Place students according to areas of interest and expertise	86	2.96	0.80
	Provide special work to students according to their interests and expertise	86	3.04	0.72

Based on the results of the data analysis, it can be concluded that for each element, the highest mean is in the knowledge element with an average mean of 3.73, followed by the understanding element with a mean of 3.54. Furthermore, the Attitude element has a mean of 3.46. The two lowest mean elements are in the Skill and Interest elements, namely 3.30 and 3.00. Of the five elements then presented, it can be seen that the highest percentage is in the Knowledge aspect, namely 93.3%. Furthermore, the Understanding aspect shows a percentage of 88.6%. The Attitude, Skill, and Interest aspects show percentages of 82.6%, 86.5%, and 75% respectively. The two lowest aspects are skills and interests. The results of the presentation of each element are clearly shown in Figure 1.

Figure 1

Graph of data analysis exploring the role of industry in work-based learning



4. Discussion

The results of the data acquisition show how the industry plays a role in *work-based learning*. Extracting information related to the exploration of the role of the industry through five elements obtained very good results regarding how information on the role of industry. The top two elements in Knowledge and Understanding show very good results related to the industry's role in *work-based learning*. The learning provided by this industry focuses on student activities which at the end of learning can produce products that can be meaningful and useful (Hartanto et al., 2023; Krajcik & Shin 2022). Of course, this is a good thing considering that the good role of industry in work-based learning can also increase student work readiness. Increased knowledge skills and individual attitudes can increase one's work readiness (Silvy et al., 2022). In addition, with a good industrial role in learning, it can provide knowledge development for vocational education (Guile & Unwin, 2022). The Attitude, Skill, and Interest elements also show very good results regarding the role of industry in work-based learning.

The provision of attitudes given by the industry can help students adjust and cultivate work attitudes that are in line with the industrial work culture. The industrial work culture that students get will improve their work performance of students, this is good for student development (Ur Rahiman & Kodikal 2017). A work culture that is embedded in students, will bring up the habit of having a work culture so that when students graduate and are ready to work they will very quickly adapt to the culture of the world of work (Eiter & Bellanca, 2020). In the industrial role skill element, is also in the very good category. Skills that are directly provided by the industry in work-based learning can increase students' capabilities at work (Suherman et al., 2022).

Furthermore, on the element of interest, results are also obtained which are in the very good category. This is good because adjusting students' interests in work-based learning will increase students' interest in working in the field they are in (Bali et al., 2022). With the results on the five elements that are very well related to the role of industry in work-based learning, it can improve alignment between schools and the world of work. Differences in understanding between schools and industry related to education which have been a problem so far can be reduced. So far schools have considered alignment with the world of work to be alignment between fields and programs of expertise that are the same as types of industry, but for the world of work, alignment is a match between the skills provided at school and those needed in the world of work (Nur, 2022). Thus, work-based learning and a good industrial role in, it can improve the quality of vocational education.

5. Conclusion

Work-based learning is a learning process that focuses on student activities directly in the industry. Through work-based learning, students can improve their understanding and skills because learning is carried out directly in the industry. The implementation of work-based learning requires an important role not only from teachers, schools, and students themselves but also the role of the industry. The role of the industry is the main thing in the successful implementation of work-based learning.

Exploration of the role of the industry is carried out through five elements including Knowledge, Understanding, Attitude, Skill, and Interest to find out how far the industry plays a role in work-based learning. The results of data acquisition show that through these five elements, the role of industry in work-based learning is in the very good category. This is certainly very helpful in the success of work-based learning. The success of work-based learning can increase the achievement of the goals of vocational education, namely preparing graduates to be ready to work in the industry.

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