Industry and Education Practitioners' Perceptions Regarding the Implementation of Work-Based Learning through Industrial Internship (WBL-II)

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***Abstract*—The crucial problem in implementing Vocational Education on diplomas in Indonesia is the relevance of competence to industry needs, work culture, and sustainable career development. The industrial internship is one of the programs and subjects organized by Vocational Education to unravel the available chain of problems. However, the fact is that the implementation of industrial internships has not positively impacted students. This study explores industry and education practitioners' perceptions regarding applying work-based learning through an industrial internship for Vocational Education Diploma (VED). Fourteen expert practitioners were involved in data collection through semi-structured interviews. Qualitative data were analyzed thematically using NVivo 12. The findings in this study were grouped into two clusters or themes, namely the role of diploma education and the skills needed by students during internships in the automotive industry. The education sector must understand the mindset, internship orientation, program planning, career path orientation in industry, and mastery of case study competencies. Internship students must master the skills of observing, increasing efficiency, productivity, service functions and access to technology, and optimizing interactions with supervisors. The success of WBL-II is in the mutual interest of stakeholders and is integrated with the higher education curriculum. This study is an input for the professional implementation of WBL-II in the future.**

***Index Terms*—Industrial internship, vocational education diploma, link and match, work-based learning.**

I. Introduction

Work-based learning (WBL) has become a severe discussion in various countries providing Vocational Education in the last decade, [1]–[3]. One of them is Vocational Education in Indonesia, held at the secondary, diploma, and undergraduate levels (educational and non-educational). The difference is the competence achieved according to the profile of the graduate. WBL is implemented in the industry according to the field [4]. The main goal is to gain work experience and form a network with the industry according to the field [5], [6]. So that post-study students have insight, knowledge, skills, and industrial culture, [7]–[11]. In this study, the term Industrial Internship is used because the program is implemented during the study period and is formal in Vocational Education Diploma (VED).

Meanwhile, mutually beneficial cooperation will result if industrial internships are appropriately implemented. However, until now, the implementation of the industrial internship program has found many important problems, namely industrial internship participants, organizing agencies, and industry as partners [6], [12]. These problems include students' readiness for insight, culture, and basic knowledge about completing the work [12]–[15]. This condition impacts passive activities, and the industry cannot do much because the value of losses is high if damage occurs outside of planning [16]. Organizing agencies have limited collaboration with industry parties relevant to the field [17], [18]. As a result, students look for industry independently, even outside the industry standards that should be. In industry, they are not directly involved in learning activities to provide fundamental insight into what to do during industry internships.

Considering the problems above and the absence of an effective industrial internship system implemented and adopted by Vocational Education in diplomas. The experience of the industry and the readiness of the organizing institution can strengthen complex industrial internships and unravel existing losses. Thus, the industry's perception regarding the implementation of WBL with an industrial internship pattern is important to explore and reveal how to prepare effective students. Finally, industry practitioners and education practitioners in the automotive sector uncovered the phenomena in industry internship providers.

Industry internship programs that are well managed and synergize between Vocational Education, students, and industry will produce quality human resources in the future [19]. In addition, simplifying and summarizing financing because the prospective workers needed by the industry already have the competencies obtained during industrial internships [20]. Moreover, the technology used in the industry is more up to date than the university, and this is an excellent opportunity for the university to keep up with the latest developments. This qualitative study aims to explore the experience of industry practitioners from WBL activities to improve more effective industrial internships. Perspectives from Vocational Education practitioners are involved in discussing findings in the field and integrating them into Vocational Education activities. The study results are in policy recommendations for higher education authorities to carry out professional industrial internships.

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II. Literature Review

A. Work-Based Learning (WBL)

WBL is a form of learning held in the workplace with an andragogy approach [21]–[23]. The purpose of WBL is training and competency improvement directly in the workplace [24]. According to [25], WBL is an important part of the Vocational Education curriculum: developing a career and good job prospects. Someone involved in WBL learns in the work environment and is involved in the habituation of the work culture that impacts work efficiency and productivity [26], [27]. In summary, WBL is the optimal solution for anticipating the rapidly changing labour market development due to technological innovation [27]–[29].

The implementation of WBL provides benefits for students, the industry where it is hosted, and higher education institutions. Among them: students have applied academic and technical learning, developed work competencies, built a relationship between education and work, explored career paths, were oriented to post-graduate job choices, and became accustomed to positive things, attitudes, and work relationships, building networks professionals for future work, and received recognition in the form of industrial certificates [9], [26], [28], [30], [31]. The benefits obtained from the industry are the production of potential, skilled, and highly motivated prospective employees, reducing training costs, providing career development opportunities, building meaningful relationships, and increasing human resource capacity [32]. Meanwhile, the benefits for Vocational Education institutions are developing curriculum and learning facilities [33], [34]; access to the latest technological developments and work techniques; meeting the needs of students; making education more relevant, and improving the quality of graduates.

WBL assists students in developing academic, social, and personal aspects [35]. Several models of WBL implementation include apprenticeship programs (AP), cooperative work experiences (CWE), credit for prior learning (CPL), internship programs (IP), job shadowing (JS), mentorship programs (MP), Industrial practices (IPs), volunteer service (VS), and worksite field trips (WFT). The similarity of the WBL model is the place of implementation, namely the industry. In contrast, the difference from the existing model is the purpose, method, time, and target of the activity.

B. WBL-II in VED

The characteristic of the implementation of Vocational Education at various secondary, diploma, and undergraduate levels is the involvement of students in industrial practice programs. Industrial practice is one of the compulsory subjects in the Vocational Education Diploma (VED) program. The industrial practice aims to develop knowledge, train students to work in a professional environment, form the competence of managers and supervisors, and promote human resources in the industry [36]. Industrial practice is held for 3 to 6 months. Students are required to find, formulate, try, find solutions to problems found in the world of work and prepare reports on the performance carried out. Students receive supervision from the supervisor under guidance from the industry during the program's implementation to monitoring student progress.

The implementation of effective industry practices in Vocational Education has not been adapted. Some obstacles to implementing industrial practices include students' readiness and Vocational Education as the holder of the authority and industry partners [35], [37]. Not many students are ready to understand the purpose of industrial practice and prepare for the needs. As a result, they do not understand what will be done during industrial practice. Vocational Education has limited collaboration and is not proportional to the number of practitioners, which impacts students having to look for industry independently and requires time and even delayed scheduling because it is limited [38]. Finally, industrial practices have no effective impact on students. Meanwhile, do not risk the planned costs from the industry side.

Empirical studies have evaluated the implementation of WBL-II in Indonesia [20]. Three aspects of the evaluation are the suitability of the industrial internship program's implementation, process, and results. The evaluation results show the suitability of 54-55% implementation based on the student's perspective. The suitability of the process aspect is 55-72%, and the result aspect is 55-72%. This phenomenon explains that students' perceptions of WBL-II are still low, and not all apprentices understand the purpose of carrying out industrial internships.

The implementation of the industrial internship has not yet had a significant impact on both parties. In line with the study conducted by Nurhadi *et al*., he explained that until now, the industry internship program implemented had not been understood by students, and readiness for work skills has not been considered [36]. In addition, there are differences in understanding between the industry and education [36]. Rosyidah *et al*., also studied the company's satisfaction with implementing the internship industry [39]. They reveal that most companies are dissatisfied. This dissatisfaction is viewed from three domains: short internship duration, unsystematic monitoring, and low student readiness. The industry expects the organizers to equip their students with product knowledge, hard skills, and soft skills. The problem of ineffectiveness and unsystematic implementation of WBL-II must receive attention. In addition, WBL-II, which is carried out professionally, benefits students, education, and industry to produce future professionals.

C. Objectives

This small-scale qualitative research aims to explore WBL activities based on the perceptions of industry practitioners and education practitioners' perceptions of the internship program. It clarifies the actions to be taken and student behaviour during the internship program and highlights the evaluation of the current internship program. Following are the questions to achieve the research objectives; how is the implementation of WBL, and what are the benefits of holding WBL to date? What are students' activities during WBL implementation? What are activities essential to prepare before students take WBL? What are activities essential to pay attention to during WBL? How to evaluate the WBL program for the future?

III. Method

This study explores the phenomenon of implementing work-based learning (WBL) from the perspective of industry practitioners and the perspective of Vocational Education practitioners. A literature review was conducted to determine operational and conceptual definitions, especially the implementation of WBL. The study used the qualitative research method. This method was chosen because it can find and understand the hidden behind phenomena that are sometimes difficult to understand satisfactorily.

A. Key Informants

The decision to determine key informants used the purposive sampling technique. Specifically, the characteristics of key informants in the study (see Table I) the criteria for the selected key informants for industry practitioners are 1) the field of industry expertise is automotive; 2) have cooperation with a VED for a minimum period of five years; and 3) have positions as manager, director of the workshop and head of the workshop. In comparison, the criteria for key informants for education practitioners are lecturers at universities with work experience of more than ten years and who have been a coordinator for managing industrial internship programs. The aim is to obtain accurate information on the limitations and challenges of industrial internship programs that have been implemented. So that the existing phenomena can be revealed, and the concept of an effective industrial internship program can be found to be applied in the VED.

Fourteen key informants, including nine industry practitioners and five Vocational Education and diploma practitioners, were involved in the research. The number of informants refers to Creswell's opinion that qualitative informants are at least three [40], [41]. So, this study has met the criteria for considering the triangulation technique [42]. The work experience of key informants in the industry is 5-18 years, while Vocational Education is 15-30 years. Based on age, the key informants are 30-65 years old. The length of work in a particular position and current age indicate that the informant can fully reveal the phenomenon and be able to account for the information.

Researchers contacted all information through a letter of application. The researcher stated his willingness to be a key informant voluntarily. Their goal is to improve the quality of WBL-II in the automotive sector and obtain the quality of human resources in the future. The key informant's name is written under a pseudonym for ethical considerations [43], [44].

TABLE I: Profile of Key Informants

Pseudonym	Role(s)	Age	Time incorporation	Career and personal background
SNP	Industry practitioner	46 Years	18 Years	Service Manager at Authorized Dealer Toyota in PT. Astra International TSO (Auto 2000).
GSO	Industry practitioner	47 Years	15 Years	Manager Aftersales Nissan-Datsun in Department Head Area II (Java, Bali, Lombok, Kupang).
NBW	Industry practitioner	45 Years	12 Years	Production support Manager in PT Komatsu Remanufacturing Asia.
MTF	Industry practitioner	47 Years	6 Years	Director Workshop Auto Body Repair in Jogja dAb,
ARS	Industry practitioner	45 Years	12 Years	Workshop Head Nissan-Datsun in Bantul.
WBW	Industry practitioner	35 Years	12 Years	Workshop Head Nissan-Datsun in Solo Baru.
IDR	Industry practitioner	30 Years	6 Years	Workshop Head Nissan in Magelang.
BFB	Industry practitioner	32 Years	8 Years	Workshop Head Nissan-Datsun in Mlati, Yogyakarta.
BAG	Industry practitioner	30 Years	5 Years	Workshop Head Nissan-Datsun in Solo Jebres.
PRJ	VED practitioner	65 Years	30 Years	Professor and Lecturer at Yogyakarta State University
HRS	VED practitioner	64 Years	28 Years	Professor and Lecturer at Yogyakarta State University
SKC	VED practitioner	65 Years	20 Years	Lecturer of Automotive Engineering Education, Yogyakarta State University. Expert Education Management
KHY	VED practitioner	58 Years	10 Years	Lecturer of Automotive Engineering Education, Yogyakarta State University. Expert in Education Policy, Expert Staff of the Ministry of Education
MSK	VED practitioner	50 Years	15 Years	Lecturer of Automotive Engineering Education, Yogyakarta State University. Head of the Diploma III Study Program in Automotive Machinery, Yogyakarta State University

B. Data Collecting Procedure

In-depth interviews carried out data collection through stage 1, interviews with nine key informants from industry practitioners. Interviews were conducted in April-May 2020 with a duration of ±60-85 minutes. Interviews used interview guidelines that VED practitioners have validated. Interviews were conducted to explore the experiences and perceptions of industry practitioners regarding the ongoing implementation of the WBL program. In stage 2, interviews with five key informants from education and diploma practitioners. The interview was conducted in June 2020 with a duration of ± 60-80 minutes. VED practitioners have validated the interview guidelines. In the final stage, industry practitioners and education and diploma practitioners gathered in a Focus Group Discussion (FGD) plan to discuss findings and evaluate the implementation of WBL. So, a new formulation was produced between the two parties to recommend that WBL organizers be more professional and effective. Instruments are reviewed based on relevant literature reviews and have been reviewed by members [45] to check the credibility of 14 key informants. Three primary researchers carried out triangulation to maintain the validity of the data [46].

C. Data Analysis

The data obtained during data mining were transcribed. Furthermore, the interview data were processed using the NVivo 12 application. The data were analyzed thematically to identify, evaluate, and draw concepts/themes based on the responses of key informants. The stages of data analysis consisted of open coding, axial coding, and selective coding [47]. Systematically, the stages of study are as follows: first, the transcribed interview data is put into a container file and

read repeatedly, then nodes are created based on descriptive coding, in vivo coding, and process coding [48].

Furthermore, the data are grouped by category and theme to produce the WBL concept. Second, the research team discussed the results of selective coding, including code simplification and integration between themes. The next step is presenting the data, which will be discussed in detail. The stages in data analysis are available in Fig. 1.

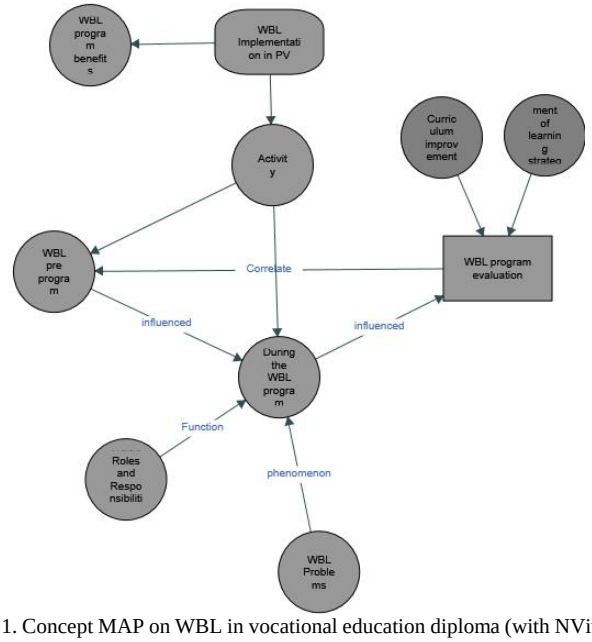

Fig. 1. Concept MAP on WBL in vocational education diploma (with NVivo 12).

IV. Findings

The results showed that the perception of automotive industry players regarding the application of Work-Based Learning (WBL) in industrial internship programs in Vocational Education followed two main themes, namely pre-WBL activities and activities during WBL. Furthermore, other related themes were found; namely, the role and responsibility of industry and problems in implementing WBL, evaluation of the WBL program were also explored based on the perceptions of expert practitioners of Vocational Education. WBL evaluation is carried out to effectively optimize the industrial internship program through WBL.

A. Activities Pre WBL-II

As stated, [GSO, ARS, BFB, BAG, WBW, and BBW], Vocational Education is essential to make various adjustments to the needs and developments of the automotive industry. The industry, as a partner, provides full support to the organizers of industrial internships in Vocational Education. Five sub-themes must be strengthened before WBL is implemented, where students as industrial internship must understand and master: 1) changing mindsets; 2) Strengthening practical work orientation; 3) "before and after" program planning; 4) orientation of practical work objectives based on career paths; and 5) mastery of case study concept competencies (see Fig. 2). This opinion was expressed by key informants as follows:

"*.... If I didn't make a program beforehand, the students thought that my obligation had been lost by running the PI and making a final report. So, no changes occur in the "*Before *and After" students. Because I have accepted students so far, I asked initially, what is your intention here? Where is the letter to find out your goals? What benefits will you take from the industrial internship program?*" [BBW (Industry/Nissan)]

"*Compiling the program must be compiled from the Vocational Education Diploma because universities understand the curriculum the most. So, we adjust the points anywhere. That's the best.*" [BAG (Industry/Nissan)]

The industry views vocational universities to ensure that students have the industrial internship program right on target before undertaking the industrial practice. At least the program becomes a student control activity to see progress "*before and after*." During this time, the industry pays attention to students regularly and does not show changes in behavior and performance. Most of them await instruction and make the same reports as previous practical students. So, it is clear that students do not have high curiosity and work passively.

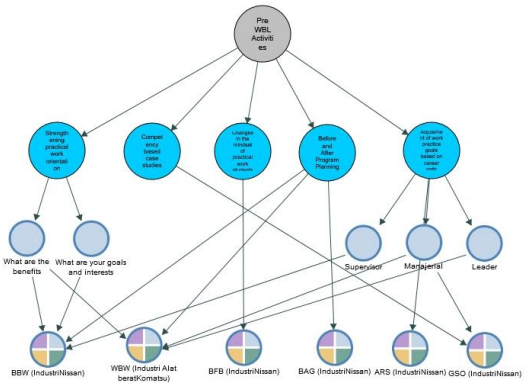

Fig. 2. Pre-WBL-II activities.

The industry reaffirms that Vocational Education is equivalent to a career path at the leader, supervisor, and manager levels. At this level, students must examine phenomena in the industry and then solve them (innovative and creative). As is the case with Vocational Education students (namely SMK in Indonesia), leaving the habit. Career level opinions have been expressed as follows:

"*At our place, D3 graduates enter grade 3, at the supervisor level. So, they are not operators, so their field skills know enough to see more phenomena and then solve the problem*". [WBW (Heavy Equipment Industry/Komatsu)]

"*In the future, the cooperation will be expanded regarding educating these people to be competent, even though the management is half-assed. But there are employee profiles so that they can be developed into service managers while working in the field.*" [SPN (Industry/Toyota)]

"*Because of this D3 mindset, we will direct him later in the industry. He will tend to be a leader, not an operator. So, like it or not, we have to optimize technically there too, plus there is also a little managerial because some of my experiences were in Mlati (workshop head at Nissan Mlati, Yogyakarta),*

and almost every Year there". [BBW (Industry/Nissan)]

For this reason, internship program students change their mindset about the goal, the benefits of participating in internships, have orientation through the preparation of "before and after" activities and have a high awareness of the field. The concept of industrial work unconsciously trains students to masterwork competencies after completing their studies and deciding to return to the industry [49]. Thus, through the experience of implementing WBL, students have consciously mastered the work climate, competence, cognitive attitudes, and values in career development [50].

B. Activities during WBL-II

The findings on activities during WBL implementation resulted in three sub-themes, namely WBL activities in the automotive sector, the role of field assistants, and problems that arise to be resolved. During the industrial internship, there has been a shift in behavior in line with industry 4.0 technology. The skills that students must master during WBL are observing, increasing efficiency, increasing productivity, improving service functions, and involving access to technology, becoming new skills to be adapted in automotive work (see Fig. 3). Below is the informant's explanation directly:

"*Students may be involved in routines, but must be able to observe the process, after which they are challenged to improve efficiency, productivity and service improvement*." [BFB (Industry/Nissan)]

Further, it is disclosed that:

"*So, if efficiency is something that can be considered, for service. Indeed, our challenge in the industry, the changing times are getting more advanced, technology is getting more advanced, and customer expectations are also getting higher*". [BFB (Industry/Nissan)]

In this context, students face adapting to the work environment quickly, without discriminating against native workers, so the work environment remains conducive to learning for WBL students [51]. However, the supervisor in the field is involved in the progress that has been set in the previous "Before and After" activity. The supervisor carries out the role of coaching and counseling. This role is a form of anticipation and control of students not to get caught up in problems. The supervisor is aware that there is a different climate between learning in vocational diploma education and actual industry practice. In addition, this is the first-time students have run the program.

Finally, it is unavoidable that so far, in the implementation of WBL, problems have arisen, although not excessive, namely *the relatively short time and obstacles in implementing new skills* [ARS (Industry/Nissan)]. A diploma in Vocational Education only allocates 256 hours which is equivalent to 40 days. *The time that has been given is minimal, causing unprofessional, troublesome, and less control work* [IDR (Industry/Nissan)]. This phenomenon has become a new record for consideration for implementing WBL in the future.

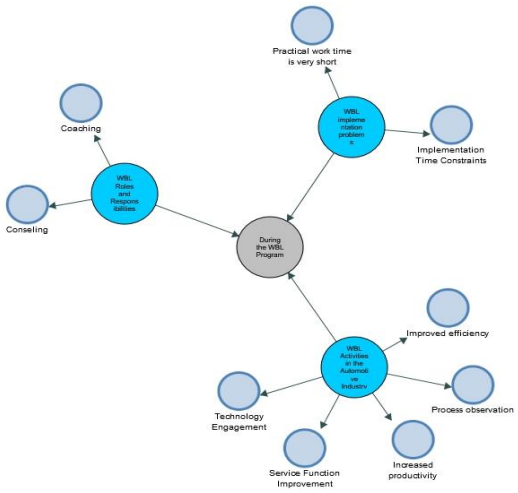

Fig. 3. Activities during WBL-II.

C. Evaluation of WBL-II

The partner industry has explored the ongoing WBL implementation and revealed problems that must be resolved in diploma education management. WBL preparation through an industrial internship should be improved. Students must have a strong practice and be responsive to the ecosystem in the industrial world. "*The need for piloting the implementation of the industrial internship for one year,"* [MSK (Vocational Education practitioners)]. Vocational Education practitioners also emphasize "*the concept of partnership which is not limited to the meaning of cooperation*" [PRJ, HRS, SKC, & KHY (Vocational Education practitioners)]. Thus, the WBL platform was developed to include curriculum improvements, learning strategies (methods, models, approaches), and the reformulation of WBL goals [20], [52]–[55].

V. Discussion

Implementing the WBL-II program is an effective strategy for students, especially getting to know the industrial environment professionally before deciding to have a career [56], [57]. Without the WBL-II program, students lose their orientation to strengthening hard skills, soft skills, industrial culture, and career strategies. In addition, technology in the industry is developing faster than technology in learning in education [58]–[60]. The ineffectiveness of the WBL-II program has caused new problems, namely the loss of student competence in adapting technology trends in the industry and industrial culture.

The automotive industry practitioners expressed their opinions regarding the systematic implementation of WBL-II and optimizing the roles of related parties into five important aspects. This aspect is addressed to education as the organizer of the WBL-II program. The first aspect is understanding the purpose of implementing WBL-II, what apprentices do, how to take action in an industrial environment, and what they want afterward? This question becomes the basis for the achievement of WBL-II students. Furthermore, an important recommendation that the industrial internship program supervisor needs to be prepared is to change students'

mindsets. Students must have a good orientation towards the industrial field used as an internship place. They know the industry profile, which division will be selected, and what competency development will be achieved. So far, students do not understand the concept of an industrial internship. This finding is in line with the study conducted by Ahsanul et.al that their understanding is low and the view of WBL-II implementation as a routine that leads to the acquisition of grades but is not oriented towards future interests [20].

Education party can do Strengthening through socialization or by bringing into the industry as guest lecturers who tell their industry's conditions or culture. Furthermore, the second aspect is strengthening the orientation of WBL-II. This provides insight for students to be better prepared during the implementation of the industry internship program. The third aspect is to equip students with the ability to develop industrial internship programs to increase the competencies achieved by students. The fourth aspect is to provide students with insight regarding the orientation of the existing career paths in the company. Thus, students understand what actions are taken to stay afloat, accelerate career positions or leave the industry in the future. The fifth aspect is the student's ability to complete case studies. Most of them do not know the flow of coordination when problems occur and do not even understand how to resolve urgent cases. As the industry desires, you must master the case study method for various problems at the VED level. This finding exceeds previous studies [36] and confirms knowledge and readiness. This study exceeded expectations where WBL-II participants were successful in the finger-level terminology in the industry.

The findings in the study also explored the role of students during WBL-II. Three discussions have been described, namely the function of industrial supervisors, implementation problems, and competencies in the automotive industry. So far, the function of industrial supervisors is less than optimal, and even interns deliberately avoid interacting openly. There should be communication and cooperative relationships between students and supervisors. Two supervisor roles were found, namely coaching and counseling. Industry supervisors should assist student progress, help complete projects and reports [61], and coordinate with academic supervisors [62]. Successful supervisors are those who give autonomy to apprentices [63].

Optimizing the role of students during WBL-II taking into account suggestions from the industry. So far, time duration has been the main problem [64], [65]. Three months is a short time and is not enough to master the problems in the industry. However, with policies by the Ministry of Education, Culture, Research, and Technology of the Republic of Indonesia for all education, especially VED, it is possible to optimize the implementation of WBL-II, which is integrated with the independent campus curriculum. This policy benefits VED to carry out the internship program [66] freely.

The third factor that students need to pay attention to while running the WBL-II program in the automotive sector is the mastery of skills, including observing, increasing efficiency, productivity, service functions, and access to technology. These skills must be mastered. These skills are decisions taken from the automotive industry, while they may differ from other fields. However, students are more capable of solving problems than students (Vocational High School or SMK in Indonesia). This finding is deliberately revealed from general skills such as employability [30].

To strengthen the role of education and students in WBL-II, the evaluation results carried out by education practitioners are integrated into the curriculum and programs on campus. Student readiness is not sufficiently formed through socialization but rather a long process. So, it takes the collaboration of all stakeholders according to their roles. Thus, student habits have been formed and can solve existing problems.

The findings in this study complement the problem of the ineffectiveness of the WBL-II program in the last few decades, especially in the automotive VED sector. The implementation of WBL-II, which has problems in the implementation process, understanding, and students' readiness, can be overcome by optimizing the role of the Education side and student internship activities. Moreover, the WBL-II program must be integrated with the education curriculum to involve all stakeholders in shaping the character and culture of the industry. The contribution of this qualitative study is the systematic implementation of the WBL-II program in VED in the automotive sector and an improvement through preparation and the roles that industry apprentices must master. This creates cooperation between all parties and provides benefits in the future, especially the production of students who are professional and ready to work.

VI. Conclusion

The perception of industry practitioners about Work-Based Learning industrial internship programs has made a fundamental change in increasing industry-minded competent resources. The suggested strategy is to explain industrial internships carried out by the education department before implementing WBL-II and direct students to master specific skills in the automotive sector and supervisory roles. The industry's role is expected to assist in coaching and counseling students effectively and systematically. The industry's role is expected to assist in coaching and counseling students effectively and systematically. Industrial internship program changes involve input from industry and are implemented in the education ecosystem.

Furthermore, industry practitioners are engaged in providing curriculum input and learning methodologies with the aim of diploma of Vocational Education having a strong relationship. Thus, the absorption of Vocational Education Diploma (VED) graduates has increased. This research is expected to be an input for planning appropriate and relevant industrial internship programs in the future.

Conflict of Interest

The authors declare no potential conflicts of interest regarding this article's research, authorship, and/or publication.

Author Contributions

S. Sutiman – Study framework development, instrument development, manuscript writing, and data analysis.

H. Sofyan – visualization/presentation of data in text, manuscript writing, and manuscript submitting.

Z. Arifin – data input and correction.

M. Nurtanto – typing, correction, and editing

F. Mutohhari – data collecting, correction, and editing

All authors have read and agreed to the published version of the manuscript.

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