Increasing the Quality of Education in Vocational Schools Through Cooperation with Industry

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ABSTRACT
Vocational high school (SMK) cooperation with industry is a form of industry support in guaranteeing the quality of education in Indonesia. The program's objectives include teaching graduates' quality to meet the industry expectation and can compete in the current job market. This study used literature studies from various research journals and combined them into substantive theories for further discussion. The results stated that cooperation between SMK and industry must be continued and strengthened because technological developments change rapidly and impact the job market demands. The cooperation between Vocational School and industry begins with an MoU and then implementing special programs such as (1) synchronizing or aligning the Vocational School curriculum following the industrial needs, (2) apprenticeships for teachers in the industrial environment that are directly accompanied by competent and qualified instructors/experts from the industry, (3) implementing project-based learning that is linked to teaching factory learning and industrial-class learning, (4) implementing teaching factory learning to provide an authentic work atmosphere for students, (5) establishing industrial classes to strengthen students' competencies, (6) fieldwork practices for students for 6–12 months in industrial environments, and (7) teaching industries for teachers and participants at school.

Keywords: *Cooperation, Industry, Quality of Education, Vocational High School.*

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1. INTRODUCTION

Vocational high school teaches students with the ability and skills to work [1]. SMK graduates are defined as students who have taken a learning program in a formal school environment and are equipped with particular expertise according to the field they have taken [2]. Okoye and Nkanu emphasize that the evidence of SMK graduates' achievement is a diploma approved by the Ministry of Education and Culture. According to Vocational Education Division, SMK graduates must be able to (1) work in their areas of expertise; (2) have a career in a different area of expertise but one that is linear with the area of expertise; (3) become a skilled workforce as needed by the business/industry world; and (4) become human beings with productive, adaptive, and creative thinking patterns [4].

SMK is vital in developing the knowledge, skills, attitudes, and competencies the industry needs [5]. SMK roles are (1) improving productive human resources skills and (2) developing entrepreneurial spirit [6]. Decree of the Minister of Education No.490/U/1992 Article 2 stated that SMK has a role in improving students' abilities to develop science, technology, and art [7].

Based on the survey results in December 2021 at several SMK in East Java province, such as (1) SMK Veteran 1 Tulungagung, (2) SMK Muhammadyah 1 Godanglegi Malang, (3) SMK PGRI 1 Gresik, (4) SMK PGRI 3 Malang, (5) SMK Islam 1 Blitar, (6) SMK PGRI 1 Wlingi, (7) SMK 2 Jember, and (8) SMK 1 Purwosari, there was lack of industrial participation in supporting SMK programs. Hence, it is necessary and mandatory that schools collaborate in various programs with the industry.

According to Yulianto and Budi [8], the current implementation of collaboration between SMK and industry includes (1) curriculum validity, (2) industrial visits, and (3) visiting teachers. These various implementations are performed through programs of (1) students' fieldwork practice, (2) Expertise Competency Test (UKK), (3) teacher apprenticeships in industrial environments, (4) practical equipment assistance and scholarships, (5) production units, and (6) workforce recruitment [9]. The cooperation is supported by the Department of Education and Culture in Indonesia regarding the link and match policy. The link and match policy was developed to increase the programs' relevance and education in SMK following the industry needs [10].

According to Billet [11]–[13], the current problem is the lack of industry participation in supporting SMK programs. In the last five years, several countries have experienced a decline in industrial participation in running the flagship SMK program [14],[15]. Therefore, this article reviewed the efforts to improve the SMK education quality through collaboration with industry that elaborated on big points regarding the importance of cooperation between SMK and industries and the cooperation that has existed previously.

2. THE IMPORTANCE OF INDUSTRY COOPERATION

A partnership is an understanding between two or more parties who agree on a common goal. It is a series of activities and principles agreed upon by several parties to achieve goals and expectations together. If one party feels disadvantaged, the partnership objective is no longer fulfilled [16]. School and industry relations are defined as a communication process to increase citizen understanding of educational needs and practices as well as efforts to improve schools [17]. Also, it is to fulfill the community needs, especially the industry, for labor.

The cooperative relationship between schools and the community, specifically the industry, is to create harmonious school-community relations and increase school education progress. Additionally, the community can benefit by enjoying the progress achieved by the school [18]. An industry is a business entity with a role in economic activity to earn income [19]. The industry covers various fields such as the automotive service sector, culinary, etc. The industry is part of society.

The role of SMK is to facilitate education in obtaining knowledge, including allocating a separate budget for education development, conducting training for teachers, and organizing various training to create workforce competence that the industry can get, especially from SMK [20]. Besides, the industry must provide an understanding of the industrial culture.

The industry is a quality-oriented party. Therefore, industrial cultures such as orderliness, responsibility, conscientiousness, quality knowledge and others to control quality must be made into a culture and applied in the education area to produce competent students. These will eventually return to the industrial world. When the industry contributes and understands the aspects of its implementation, SMK will understand and make it the knowledge that will eventually be applied in the world of work. The industry quality will increase with a quality workforce.

According to [21], the industry's existence in the SMK learning environment is to shape the industrial attitude and character as the basis for work. The criteria that must be met for industries that cooperate with vocational high schools are (1) industries with a good reputation in the community, (2) industries that are willing to work together, and (3) industries' fields of work that align with the school's competence. It can be formulated that the cooperation impact between SMK and the industry provides multiple benefits, such as the school gaining knowledge and strengthening students' work character. In contrast, the industry gets prospective workers following their needs.

According to [16], [22], the main principles in the cooperation between SMK and industry are (1) mutual benefit, (2) mutual strengthening of cooperation, (3) mutual need, (4) equality of attention, (5) transparency, and (6) common commitment.

Based on the description above, the importance of cooperation between SMK and industry must be instilled because it provides economic benefits in

preparing superior resources, facilities, and infrastructure to produce quality graduates with industrial standards [16].

3. COOPERATION WITH THE INDUSTRY

Cooperation is an alliance between two or more parties of mutually beneficial agreements outlined in an agreement document or an MoU. It is necessary to build cooperation between SMK and industry and must be maintained between middle and high levels vocational education institutions. The MoU agreement is essential and is a strategic step for SMK to carry out their special programs [12], [19], [23].

Examples of implementing cooperation between SMK and industry are (1) curriculum synchronization, (2) industrial apprenticeships for teachers, (3) project-based learning, (4) teaching factory learning model, (5) industrial class management, (6) students' fieldwork practice, and (7) the teaching industry. They are all explained as follows:

3.1 Cooperation with Industry in Curriculum Synchronization

School policy is regulations or rules enforced according to actual school conditions by considering several existing aspects [24]. Thus, it is necessary to connect and adjust policies and strategies to increase the efficiency and effectiveness of the SMK system in Indonesia. A good strategy guarantees that all stakeholders know and understand their respective abilities to work effectively [25]. Furthermore, as emphasized by [24], school policy is in a vortex or cycle which questions balance, strategy, and support from various parties that support the running of learning in schools so that the strategic policies and objectives of SMK can be managed by developing human resources following the increased knowledge and skills [26].

Learning activities in schools will not run optimally without a curriculum. A curriculum is a substantial element in vocational education because it is used as a reference before the teacher delivers material [27]. According to [28], a curriculum is a learning activity students must do to achieve particular competencies. The curriculum concept is developed in alignment with the development of theory and practice in education. A curriculum is a document developed in written form to plan and organize an organized experience for student learning [29].

Curriculum alignment is an activity carried out by SMK in equating perceptions, goals, and learning achievements with the industry's needs. Curriculum alignment is done by presenting the KI-KD contained in the SMK national curriculum to industry representatives who would provide advice and input and convey the competencies needed by the industry.

Alignment of the SMK curriculum is a strategy by vocational schools in an open presentation containing competency to industry representatives [30]. The synchronization is a combination of industrial and national curriculum competencies based on the agreement of the two parties [31]. The KI-KD was presented and followed by the presentation of the industry. Meanwhile, the industry identifies the need for industrial competence, whether it aligns with SMK and continues with aligning the two competencies in the curriculum [32]. Then, the synched curriculum was implemented along with industrial supervision.

3.2 Cooperation with Industry in Teachers' Internships in Industry

Vocational schools must guarantee the continuity of all learning processes and delivery services for teachers and staff for further studies [33]. Schools must also develop a culture to prepare students and graduates with relevant soft skills for the industry. Work culture in the industry must be essential to the educational process. Teachers are actively involved in the SMK learning implementation. According to Beeby [34], teachers as the fundamental thing is the spearhead in improving the quality of services and educational outcomes. Besides, according to Brevik et al. [35], one of the factors of educational success can be determined from the teaching staff sector.

A teacher is responsible and has an important role in carrying out the process of teaching and learning activities [36]. Productive teachers are essential in creating skill competencies and work culture in SMK graduates [37]. Developing SMK teachers and staff competency is through apprenticeships at industrial sites. In preparing teachers for the SMK program, among other things, it is stated: (1) teachers are given supervision and guidance by school supervisors and the education office, (2) teachers are given work details for during the mentoring process, and (3) teachers are given a schedule for the mentoring process [36].

Teacher apprenticeship in the industry can increase teacher professionalism. According to [38], educational success depends on teachers' quality which starts with the quality of education and training. Hence, a qualified teacher is a teacher who has done self-development of professional competence in direct education and training in a company. Teacher apprenticeship in the industry plays a role in increasing competence through teacher education and training. Along with technological developments, the college apprenticeship experience differs from the office teacher apprenticeship experience. Teachers' knowledge must be updated to increase students' quality.

3.3 Cooperation with Industry in Project-based Learning

Sobiechowska [38] states that learning must provide a variety of flexible methods to accommodate the diverse needs of students. There are many learning methods in vocational programs, such as Project-Based Learning, Work-Based Learning, Distance Learning, E-Learning, and Blending Learning. Project-based learning begins with curriculum planning with scenarios on project programs that will be made in learning activities

so that at the end of learning, there is a finished product that suits for sale or benefits the community. Its implementation could work with various industrial community institutions to make learning meaningful [39].

Project-Based Learning is a learning that uses scenarios for making projects or products that are used as learning media to achieve learning objectives [39]. The distinctive feature of project-based learning lies in the students' activities in producing items and applying the skills of researching, analyzing, creating, and presenting learning products based on experience. Project-based learning allows students to plan products, determine work steps, and conduct quality assurance independently and in a structured way [40]. The resulting product is goods or services that are useful in the community.

Project-based learning is a comprehensive teaching approach in which the learning environment is designed for students to think critically in determining project creation or solving everyday problems [41]. Here, students are given complete, realistic assignments or a picture of the project to be worked on and the finished product so that students can determine work steps or solve problems encountered in making products. At the same time, the teacher acts as a facilitator only. There are four principles of project-based learning: (1) making assignments to determine steps, (2) integrating the steps taught by the teacher in previous competencies, (3) paying attention to the difficulty level, (4) teacher as facilitators who monitor students' progress [42].

The benefits of implementing project-based learning, according to [39] in SMK, are (1) supporting/strengthening the collaboration between students in learning concepts, (2) increasing teacher capacity in guiding students, (3) students doing accurate and integrated applied research on the products produced, (4) increasing industry confidence to absorb SMK graduates, and (5) creating a trust to increase industry cooperation/support for SMK.

3.4 Cooperation with Industry in Implementing Teaching Factory

Learning in SMK is a process of stakeholder interaction in a learning environment. Learning principles according to the Ministry of Education and Culture [43] are as follows: (1) learning is designed by considering the stages or steps that students need from scratch to understand the material; (2) learning is designed and implemented to build lifelong knowledge; (3) learning process supports the character or attitude development; (4) learning is designed to be applied in the community environment; and (5) learning is oriented towards work.

Factory learning is an example of learning that is oriented to the process of production activities in a company. Teaching factory combines learning and a natural work environment so that it is expected to bring up learning experiences relevant to the industrial world [44], [45]. Teaching factory integrated learning with partner industry in production workshops that already exist in schools to increase their competence, impacting workforce competitiveness [46], [47]. Teaching factories have their legal basis: to prepare students or vocational graduates to become a professional workforce [48]. The production unit is used for business development in schools to increase school income, increase human resources, maintain equipment, and provide real work experience to students.

Hadlock [49] explained that the purpose of the teaching factory is to make people aware that the teaching process should be more than what is in the book. Students are not only required to practice soft skills in learning but also learn to work in teams, practice interpersonal communication skills, and get hands-on experience. Teaching factory learning teaches students to look for problems and find solutions, build prototypes, learn to make business proposals, and learn to present solutions [50], [51]. Roche (2017) also explained that with the help of the industry, teaching factory will impact participants through learning experiences in actual conditions (life-based learning).

Schmidbauer [53] argues that teaching factory learning always maintains the quality of learning and is accompanied by evaluation to improve the program. Evaluation is defined as an activity carried out by someone to collect information on whether or not a program stage has been achieved (planning, implementing, and ending the program) [54]. Thus, it can be formulated that the evaluation aims to develop and improve quality-oriented learning systems or the results of learning that have been implemented.

3.5 Cooperation with Industry in Managing Industrial Class

Collaboration between SMK and the industry is a must to equalize and synchronize the learning at SMK with the industry. Hence, implementing Teaching and Learning Activities (KBM) in schools can adjust to existing developments in the industry and ensure the competency achievements that students acquire while studying at the school. It can be said that schools with industry can improve the quality of graduates who will occupy job vacancies in the industry. According to Utomo (2017), the criteria that the industry must meet in collaboration with SMK institutions are: (1) at minimum, industry on a national scale, (2) the industry is willing to cooperate, and (3) their field follow the competencies that schools' open to cooperate.

As described above, various forms of industrial cooperation and the implementation of the industrial class exist. Utomo (2017) states that the industrial class is a particular class held to answer the needs for new and competent job requirements for the future. Meanwhile, according to Firmansyah et al. (2019), an industrial class is an activity inside and outside the classroom attended by students by studying directly or getting direct industrial material following the industry's needs.

In industrial class, there are some particular considerations [23], [56]–[59]:

3.5.1 Industrial Class Standardization

This standardization includes implementation objectives. The scope of industrial class standardization that can be used as an indicator of success includes: (1) the completeness of learning facilities and infrastructure as set by the National Education Standards (SNP), (2) the breadth of learning materials, (3) human resources, in this case, are teachers and education staff, (4) learning scenarios, and (5) learning evaluation.

3.5.2 Industrial Class Planning

In industrial class planning, the emphasis is on increasing students' vocational competence; the expected graduates in the industrial class have competencies ready to work according to industrial needs. Industrial class planning activities include (1) preparation of students in terms of mental and K3 knowledge, (2) teacher qualifications, (3) lesson planning, (4) preparation of teaching materials or materials, and (5) and preparation of learning facilities and infrastructure that comply with industry standards.

3.5.3 Industrial Class Implementation

The implementation of the industrial class is a learning portfolio that exists in the industry to be applied in the world of education, such as: (1) implementing 5S and 5R, (2) factory learning, and (3) project-based learning.

3.5.4 Industrial Class Evaluation and Supervision

Evaluation is a program carried out between industry and vocational schools to guarantee the implementation of industrial class programs. In the evaluation program, several models are used, including (1) monitoring learning once a week, (2) monitoring learning once a month, and (3) monitoring learning once a year through a skill competency test program.

3.6 Cooperation with Industry in Students' Fieldwork Practice

Programs to strengthen students' competence at SMK CoE include the implementation of Field Work Practices (PKL) and Expertise Competency Tests (UKK). Suartika [60] explained that fieldwork practice provides opportunities for students at SMK to deepen and experience real industrial situations and conditions following their program of expertise. Through fieldwork practice activities, students are prepared to become skilled and professional middle human resources following the field and the industry's needs. This preparation process includes three domains: cognitive, psychomotor, and affective.

Fieldwork practice is an industry education and learning training approach to improve the quality of SMK graduates [61]. Fieldwork practice is a form of authentic learning that aims to increase knowledge, skills, and work culture in SMK students [61]. It is a form of placing students in a field practice learning process as a means of learning [4]. Furthermore, mapping the location of fieldwork practice in the industry must follow students' background expertise [61].

Fieldwork practice is a learning program that every student in the industry must take as a concrete manifestation of the implementation of the education system in SMK, namely Dual System Education (PSG). The school and DUDIKA jointly developed the PKL program to meet the learning needs of students. It is also an industry contribution to developing vocational education programs [32].

According to Umiati [62], the purpose of fieldwork practice for students is (1) to provide opportunities to practice management skills in actual employment situations, (2) to provide practical experience, (3) students have the opportunity to solve various problems in the field by empowering their abilities, and (4) approaching and bridging the preparation of students to enter the workforce.

3.7 Cooperation with Industry in Industrial Teaching

Training is a process of actions, activities, and training for educational purposes [63]. Training is likened to how a teacher and students are in a class. The Presidential Instruction, in collaboration with the Ministry of Education and the Ministry of Industry, stated that 2021–2022 would focus on handling human resources development, industrial training, and up-skilling to produce human resources with suitable qualifications and quality [64].

The company's training and service programs are aimed at sustainable development and people's welfare, considering the stakeholders' expectations, complying with the law and consistent with international norms, and integrating with business activities. Meanwhile, some goals that motivated the program's external implementation contribute to improving Indonesia's human development index (IPM) through industry-leading programs [65].

Training is a coaching technique that adds insight/knowledge for teachers. Training needs to be done and followed by the teacher, and the teacher needs follow-up to apply their experiences in the learning process [66]. Training implementation is guided by instructors or industry experts with more competence and experience [67].

There are several forms of industrial training in collaboration with SMK [66], [68], [69], including (1) industrial work culture training, including K3, 5R, and fire drill participation; (2) industrial competency training in an up-skilling program for educators conducted at industrial sites; (3) industrial competency training in up-skilling program for teaching staff in collaboration with education and training institutions; (4) Potential Development Program for the area around industry to increase the productivity and skills of the surrounding community; and (5) Competency Tests at industrial sites.

In short, the cooperation above can be explained through the Figure 1 below.

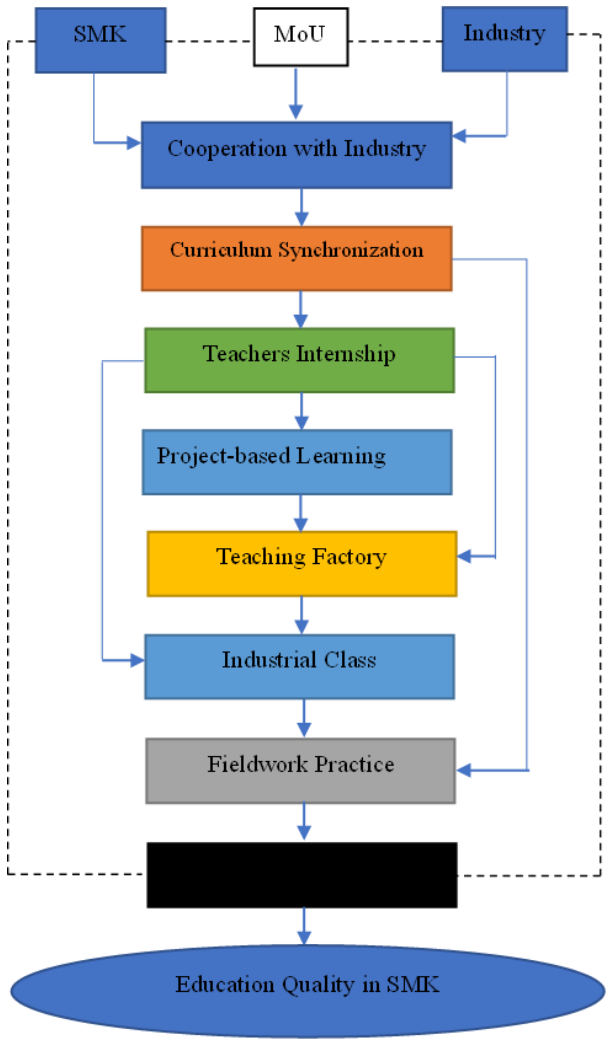

Figure 1. Cooperation between SMK and Industry to Improve SMK Quality of Education.

Figure 1 explains the collaboration between SMK and the industry, starting with SMK submitting a cooperation proposal to the industry as evidenced by the MoU. The cooperation starts with curriculum synchronization, including school competencies with industrial learning competencies in schools (PjBL) and industry (PKL). The following cooperation is a teacher apprenticeship in the industry to prepare a teaching factory program and industrial class. The final point in collaboration is teaching industry programs or visiting teachers from the industry to conduct training and workshops. The cooperation aims to guarantee the quality of education in SMKs, such as in administration, teachers, learning, students and graduates.

4. CONCLUSION

Vocational high schools must actively pursue and maintain cooperation with industries to guarantee the quality of schools, teachers, and graduates. The cooperation was started by agreeing on MoU and continued with programs such as (1) curriculum synchronization, (2) industrial internships for teachers, (3) project-based learning, (4) teaching factory learning model, (5) industrial class management, (6) students' fieldwork practice, and (7) industrial teaching in schools.

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