

**LITERATURE STUDY: *TEACHING FACTORY* IMPLEMENTATION ANALYSIS
IN THE WORLD OF VOCATIONAL EDUCATION IN INDONESIA
AS AN EFFORT TO FACE FUTURE CHALLENGES**

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Abstract. Vocational High School is a vocational education unit at the secondary education level which aims to prepare students to be able to work, either independently or fill existing job vacancies as middle-level workers in accordance with their competencies. One of what makes Vocational High School independent is the teaching factory in it. Destination this research is to analyze implementation of the *teaching factory* in the world of vocational education using the literature study method. The results show that the teaching factory able to improve the competence of graduates, the implementation of *Teaching Factory* in Vocational High School can be measured based on the *7x7 Parameter Assessment for Implementation of Teaching Factory*. *Teaching Factory* is a combination of competency-based learning and -based learning production and applied based on actual work procedures and standards for produce products according to the market.

Keywords: *Teaching Factory*

Studi Literatur: Analisis Pelaksanaan *Teaching Factory* pada Dunia Pendidikan Vokasi di Indonesia Sebagai Upaya Menghadapi Tantangan Masa Depan

Abstrak. Sekolah Menengah Kejuruan adalah satuan pendidikan kejuruan pada jenjang pendidikan menengah yang bertujuan untuk mempersiapkan peserta didik agar mampu bekerja, baik secara mandiri maupun mengisi lowongan pekerjaan yang ada sebagai pekerja tingkat menengah sesuai dengan kompetensinya. Salah satu yang membuat SMK mandiri adalah adanya *teaching factory* di dalamnya. Tujuan penelitian ini adalah untuk menganalisis implementasi *teaching factory* dalam dunia pendidikan vokasi dengan menggunakan metode studi literatur. Hasil penelitian menunjukkan bahwa *teaching factory* mampu meningkatkan kompetensi lulusan, implementasi *Teaching Factory* di SMK dapat diukur berdasarkan Penilaian Parameter 7x7 Pelaksanaan *Teaching Factory*. *Teaching Factory* merupakan perpaduan antara pembelajaran berbasis kompetensi dan pembelajaran berbasis produksi dan diterapkan berdasarkan prosedur dan standar kerja yang sebenarnya untuk menghasilkan produk yang sesuai dengan pasar.

Kata kunci: *Teaching Factory*

INTRODUCTION

Vocational High School (SMK) is a vocational education unit at the secondary education level whose purpose is to prepare students to work, either independently or to fill existing job vacancies as middle-level workers in accordance with their competencies (Law number 20 of 2003) . 2003). Vocational High School is an educational institution that has the aim of preparing skilled students and ready to enter the Business World and the World of Work and always tries to match the graduate skills needed in the industrial or business world by developing a professional attitude (Hutami & Hera, 2021). Vocational High School graduates are asked to improve competency standards in order to be able to compete in facing global challenges. According to Charles Proser in 16 Principles of Vocational Education, one of

which is *Vocational Education will be Efficiency in Proportion as the Environment in which he must then work*, which means that Vocational Education will be efficient if the environment is taught to adapt to the replica of the environment in which students will work. Vocational Schools as printers for prospective workers must prepare a good education system so that graduates from Vocational Schools have *bargaining power*. The conclusion that can be drawn from this research is that to improve the quality of human resources for vocational school graduates, it is necessary to apply education with a replica of the world of work in schools. (Supriyantoko, et al, 2020).

Education that supports future development is education that is able to increase the potential of students, so that they are able to face and solve life problems. Education must hold the potential conscience and competence potential of students. The concept of education will feel increasingly important when a person has to enter social life and the world of work, because he must be able to apply what he learns in school to deal with problems faced in everyday life today and in the future.

Teaching *Factory learning* is a good breakthrough as the government's effort to equip SMK graduates to be able to be independent because they are equipped with quite good skills. The concept of *TEFA* learning is learning that carries out production or services this is part of the learning process. This shows that a learning process that refers to expertise or skills (*live skills*) is designed and carried out according to actual work procedures and standards to produce products that match market tastes.

Teaching Factory (TEFA) is a flagship program for SMK to prepare Human Resources who are ready to enter the world of work. The *Teaching Factory program* is classified as a new program (Sanatang, 2020). There are still many people who do not know or know about this program and the community also needs to get knowledge about What is *Teaching Factory*? How is it implemented in schools? *Teaching Factory* (factory within the school) is a production facility that is operated based on actual work procedures and standards to produce products that are in accordance with the real world conditions of a business or industry. In running the *Teaching Factory program*, all elements in the school and support from DUDI are needed so that all programs run successfully. The conclusion that can be drawn from this research is that the existence of a teaching factory has an impact on students being able to learn the procedures and standards of the production process like real conditions in the industry. (Hidayat, 2011).

Teaching Factory Learning Patterns in the Furniture Engineering Expertise Program at SMK Negeri 1 Purworejo include; 1) the teaching factory learning process that has been running is able to integrate quite well with the Furniture Engineering Expertise Program; 2) the resources of educators are still not sufficient and the completeness of facilities and infrastructure at SMK Negeri 1 Purworejo is still quite incomplete so that it affects the implementation of practice; 3) the products produced by class XI students in the Furniture Engineering Expertise Program are in accordance with consumer needs; 4) cooperation between SMK Negeri 1 Purworejo and the furniture industry is still lacking, but future efforts the school will try to be able to cooperate with industry (Jaedun & Prihadi, 2020).

Implementation of the *Teaching Factory* SMK automotive engineering expertise program is a learning activity where students directly carry out production activities. The resulting product has quality so that it deserves to be promoted and accepted by consumers. The implementation of *TEFA* in the Automotive Skills Vocational School can be realized in the form of the development of *Teaching Factory facilities* within the school environment and outside the school environment. The products produced are in the form of vehicle maintenance and repair services as well as vehicle body production (Siswanto, 2015).

A study on the implementation of the *Teaching Factory* (*TEFA*) learning model on

online business and marketing skills competencies at SMK Negeri 1 Sinjai. The results of the research test on teachers showed that (1) The role of the human resource aspect in the application of *TEFA learning* on the Online Business and Marketing Expertise Competence at SMK Negeri 1 Sinjai was in the very good category; (2) The role of the partnership aspect in the application of teaching factory learning on the Competence of Online Business and Marketing Skills at SMK Negeri 1 is in the very good category; (3) The role of facilities and infrastructure aspects in teaching factory learning on Online Business and Marketing Expertise Competencies in SMK Negeri 1 is in good category; and (4) the role of the product aspect in the application of teaching factory learning on the Competence of Online Business and Marketing Skills at SMK Negeri 1 in the good category (Khaliq, 2021). *Teaching Factory Implementation* research in the Computer and Network Engineering expertise program at SMK Negeri 5 Makassar, South Sulawesi, showed that (1) TEFA in the TKJ expertise program at SMK Negeri 5 Makassar had worked well because it implemented management, namely planning, organizing, implementing, and controlling. And supported by TEFA components, namely human resources (HR), administration and finance, equipment, curriculum, learning, products, and marketing. (2) The implementation of TEFA in the TKJ expertise program at SMK Negeri 5 Makassar runs because of other supporting factors : school principals, managers, facilities, students, DUDI support. (3) The implementation of TEFA is not sustainable due to obstacles, including: the product produced does not have a license, quality control is not standardized, funding assistance from the government and DUDI is limited, and managers are inexperienced. So the results of this study can be concluded that the Teaching Factory at SMK Negeri 5 Makassar has been going well, but due to internal constraints and lack of cooperation with industry, it has experienced problems. (Sanantang, 2020).

Research on the Implementation of Teaching Factory in SMK N 1 Kalasan to Support the Development of Creative Industries shows that the work program planning begins with the formation of teams for each unit in accordance with their respective expertise competencies. The implementation of the teaching factory in the production process involves students. Evaluation of the implementation of the teaching factory carried out in the form of a comprehensive evaluation and post-activity evaluation. So the results from this study can be concluded that the teaching factory is going well at SMKN 1 Kalasan with a team according to their duties and competencies (Hutami & Hera, 2021).

Evaluation of the Implementation of Teaching Factory Policy with the CIPP Evaluation Model at SMK Negeri DKI Jakarta showed that 89% of the teaching factory were implemented, for some schools, adjustments needed to be made. The purpose of the teaching factory is to foster an entrepreneurial spirit in students, become competent workers, and be able to continue to the vocational education level above. The conclusion that can be drawn from this research is that the teaching factory policy in general can be implemented at the DKI Jakarta State Vocational School with the achievement of the percentage of schools that organize as much as 89%. (Iwan S., Akbar Jaya., Vidyatama K., & Putri Ghanim SH., 2020).

Quite a radical change occurred in the industrial era 4.0 caused by the development of technology in human life. Currently, Indonesia has more than 25% of the young generation who are unemployed or working but not according to their competence. Several factors are behind this, one of which is teaching and learning activities in vocational schools which are still conventional. Learning activities have not implemented integration between competency-based learning and production-based learning so that the graduates produced are not able to compete in the global world.

This is certainly a correction for educators to be able to create innovations in learning management to be able to prepare graduates who are ready to work. Vocational High School

(SMK) is one of the places to prepare qualified, skilled and professional human resources. In addition, SMK also aims to prepare students with certain competencies and skills to be ready to enter the world of work and be productive in their respective fields.

Based on the explanation above, the purpose of making this scientific article is to find out the results of the Analysis of *Teaching Factory* Implementation in the World of Vocational Education in Indonesia as follows: Effort Facing Future Challenges.

METHOD

The method used in this research is a literature study using 12 journals that focus on the implementation of *Teaching Factory* in the world of vocational education in Indonesia as an effort to face future challenges. There are three stages that will be used in the selection of journals: 1) the use of keywords, namely the Implementation of *Teaching Factory*; 2) select articles related to the title discussed; 3) study the literature and look for influencing factors. In searching journals, several databases are used, including: Google Scholar. This literature study focuses on the arguments and ideas in a field of study that contains the gaps in a theory and a case and to find out its weaknesses. The theories that have been collected will support the topic in this research, then the data will be managed and linked to the relevant theories. Thus, it will produce a concept in completing this research.

RESULTS AND DISCUSSION

Application of teaching learning factory refers to a product that generated and business management. The process includes planning, production, packaging and distribution or marketing. Supervision of every activity carried out by the supervising teacher.

Definition of Teaching Factory

Teaching factory is a learning concept where students feel the real situation to equalize the competency gap between the knowledge conveyed by the school and the needs of the industrial world. Innovative learning and productive practice are educational methods that are oriented towards managing students in learning to be in line with the needs and demands of the industry (Kuswantoro, 2014). *Teaching Factory* where schools carry out production activities or services that are part of the process teaching and learning so that schools are required to have a factory, workshop or other business units for *teaching factory* implementation learning activities in schools Vocational schools have combined business concepts and vocational education in accordance with relevant expertise competencies (Moerwismadi, 2009).

TEFA is one of the efforts to be able to present the real world of industry or work in the school environment. In its implementation, the aim of *Teaching Factory* is These include: 1) Increasing the competence of SMK graduates, 2) Adding the entrepreneurial spirit of SMK graduates, 3) Obtaining products in the form of goods or services that have added value (Herminarto, 2008).

According to Agum Anugrah UH, et al (2020) *Teaching Factory* is a step in preparing superior human resources. According to Agung Kuswantoro in Mahmud Rayyan et al., it is stated that the definition of *TEFA* is the concept of learning in real situations in the industrial world. *Teaching Factory learning*, students directly carry out production activities in the form of goods or services. The resulting product has quality so that it is accepted by consumers (Student, 2015). Thus, it can be concluded that *Teaching Factory* is an effort carried out in a learning process where students are prepared to become superior human resources then in its implementation students feel directly the activities that occur in the business world and the industrial world.

The Purpose of Teaching Factory

As one of the *teaching factory learning strategies*, the goal is to prepare students to be ready to work. Scientific articles published by the *American Society for Engineering Education Annual Conference and Exposition*, Alptekin, et al, 2001) in Siswanto(2015) stated that the purpose of *Teaching Factory* is to produce professional graduates, improve modern curricula, and demonstrate appropriate solutions to face global challenges. industry.

In the road map for the development of Vocational High Schools 2010-2014 (Directorate of PSMK: 2009) *Teaching Factory* is one model to empower Vocational Schools in creating graduates who are competent in the industry and have the appropriate skills so that they are easily accepted in the industrial world. Furthermore, the purpose of *TEFA* is to improve and develop the quality of learning through the process of learning by doing (*learning by doing*) so that this learning will foster an entrepreneurial spirit for students.

The PSMK Directorate (2008) also stated that the aim of the *Teaching Factory* is to increase the graduates of SMK students. Goods or services produced from *Teaching Factory activities* must also be accepted by consumers and the community. The services or products produced must meet the criteria for selling so that they can generate added value for schools.

Thus, from the several opinions that have been stated above, it can be concluded that the *Teaching Faculty* has the following objectives:

- a. Improving the Competence of Vocational High School Graduates
- b. Improving the entrepreneurial spirit of SMK graduates
- c. Produce products in the form of services or goods that have added value
- d. Increase cooperation with relevant industries

Teaching Factory Learning

The learning model is a pattern that is used as a guide in planning learning such as the preparation of curriculum, organize materials and provide teacher instructions in class and tutorials. Activities in the learning process can be realized through the use of approaches from various learning models and student-centered learning processes Agus Suprijono (2010:46).

Teaching Factory Learning is a combination of competency-based learning and -based learning production and applied based on actual work procedures and standards for produce products that match the market (Azizah et al., 2019).

Teaching Factory learning model, students must be given assistance to be able to learn and work independently and in groups to produce a quality product (goods/services) in a predetermined learning schedule, using learning materials that are arranged in harmony and integrated with industrial values. Products (goods/services) produced in the teaching factory learning model must be able to function as a medium for introducing competence, and not just the result of practice or utilization of laboratory or workshop equipment (Directorate of Vocational Development, 2017).

Teaching Factory is a learning activity that teaches mastery of skills in certain fields based on procedures and standards in accordance with the world of work. The learning activities carried out are a replica of the world of work which will later become the reality of the world of student work after graduating from SMK. In addition, *Teaching Factory learning* integrates training and problem solving through practical processes in schools. The legal basis for the implementation of *Teaching Factory* in Indonesia are:

1. Law Number 20 of 2003 concerning the National Education System.
2. Law Number 17 of 2007 concerning the National Long-Term Development Plan (RPJPN) 2005-2025.
3. Government Regulation Number 17 of 2010 concerning Management and

Implementation of Education.

4. Law Number 3 of 2014 concerning Industry.
5. Government Regulation Number 32 of 2014 concerning National Education Standards.
6. Government Regulation of the Republic of Indonesia Number 41 of 2015 concerning Development of Industrial Resources.
7. Presidential Regulation of the Republic of Indonesia Number 14 of 2015 concerning the Ministry of Education and Culture.
8. Presidential Regulation of the Republic of Indonesia Number 14 of 2015 concerning the Ministry of Education and Culture.
9. Presidential Instruction Number 9 of 2016 concerning Revitalization of Vocational High Schools.
10. Regulation of the Minister of National Education of the Republic of Indonesia Number 40 of 2008 concerning Standards of Facilities and Infrastructure for Vocational High Schools/Vocational Madrasah Aliyah (SMK/MAK).
11. Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 22 of 2016 concerning Standards for Primary and Secondary Education Processes.
12. Regulation of the Minister of Industry Number 3 of 2017 concerning Guidelines and Development of Competency-Based Vocational High Schools that *Link and Match* with Industry

In accordance with the legal basis above and based on the *Teaching Factory* Governance guidelines from the Directorate of Vocational Education at the Ministry of Education and Culture, here are some principles for implementing *Teaching Factory*:

There is an integration of work experience into the school curriculum.

1. Educational actors, equipment and materials used in the educational process are arranged and designed to carry out a production process whose purpose is to produce goods or services.
2. Combining production-based learning with competency-based learning.
3. Students are directly involved in production-based learning so that the competencies learned are based on the production process carried out. The main key to the successful implementation of learning is the production capacity and the type of product produced
4. Schools are directed to have workshops, factories, and other business units that can be used as learning vehicles for students

Through the application of these principles, it is *hoped that* SMK graduates can have experience and competence in working according to their fields, entrepreneurship, or continuing to the vocational level above. So that this can reduce the high unemployment rate for SMK graduates caused by the low competence of graduates. The objectives of implementing

Teaching Factory -based learning in SMK are:

1. Prepare students to have skills, attitudes, work culture according to the demands of the world of work in their fields.
2. Prepare students to have the skills to be able to become entrepreneurs in accordance with their competencies .
3. Utilize the facilities and equipment owned by the school so that it is efficient and has economic value.
4. Strengthening cooperation between schools and industry or in other terms, namely optimizing *link and match* schools with industry.

Interconnected components in the *Teaching Factory* program in SMK can be briefly described as follows:



Figure 1. Interrelationships in the Implementation of *Teaching Factory*

The *Teaching Factory* concept is a development of the interrelationship of production-based education, entrepreneurship, and dual system education. The following is a schematic of the linkage between products and services to entrepreneurship and dual system education.



Figure 2. The relationship between Products & Services, Entrepreneurship, and Dual Systems

Teaching Factory is a model of learning activities that are very effective and efficient. Effective means that the *Teaching Factory* concept can lead students to reach the competent stage, which is a stage where students deserve to be given authority because they are considered capable. Efficient means that learning with this model is very operational, requires low costs (materials are available) and is easy to implement.

basic values that must be developed to support the readiness of *Teaching Factory* implementation include: a) *Sense of quality*, b) *Sense of efficiency* and c) *Sense of creativity and innovation*.

The production process for both goods and services , the implementation of *Teaching Factory* must involve the following three industrial disciplines:

- a. Time discipline; produce goods or services with the promised or targeted time.
- b. Discipline of quality/quality; produce goods or services with the promised quality,

precision and exact composition.

- c. Procedure discipline; following the procedures that must be followed, because skipping one of the procedures can have a negative impact on the production results or the condition of the machine/equipment.

The success of the implementation of the method *Teaching Factory* learning can simply be seen from two main indicators including:

- a. Utility and sustainable use of equipment (can Furthermore, Lomovtseva (in Yahya 2018), be seen through the implementation of block Edmond and Oluyi (2014) explain that and continuous learning systems).
- b. Integration of production processes or services into teaching materials. To prove these imposed on a group but becomes a shared achievement of these two indicators, there are responsibility. Vocational education is also several aspects that must be considered by the directed at increasing individual institution.

Future Challenges of Vocational High School

Mapping challenges and opportunities industry 4.0 to prevent various impacts on people's lives, One of them is the problem of unemployment. Unemployment and power problems The competitiveness of human resources is a real challenge for Indonesia. Industry 4.0 challenges and opportunities encourage innovation and creation of vocational education.

industrial 4.0 era while still paying attention to aspects of humanity (humanities). The challenges of vocational education are increasingly complex with industry 4.0. Responding to the challenges of industry 4.0, Bukit (2014) explained that vocational education (Vocational Education) as education that is different from other types of education must have the following characteristics;

- a. Oriented to individual performance in the world of work
- b. In accordance with the real needs in the field
- c. curriculum is designed to be able to emphasize on psychomotor, affective, and cognitive aspects
- d. The benchmark for success is not only limited to school
- e. Be sensitive to the development of the business world / industrial world and job opportunities that exist today
- f. Requires adequate facilities and infrastructure; and
- g. There is community support.

Brown, Kirpal, & Rauner (in Yahya 2018) add that vocational training and skill acquisition are very important affect identity development someone related to work. Furthermore, Lomovtseva (in Yahya 2018), Edmond and Oluyi (2014) explain that vocational education is a place for forging one's maturity and skills so that it cannot only be imposed on a group but becomes a shared responsibility. Vocational education is also directed at increasing individual independence in entrepreneurship in accordance with their competencies (Kennedy, in Yahya 2018).

Vocational education and training is an educational approach that emphasizes the needs of the industry so that individual improvement and development can be carried out in addition to being carried out in school but also in industry. The government seeks to respond to the challenges of industry 4.0, the threat of unemployment by focusing on improving the quality of human resources through vocational education. Government through cross policy Ministries and agencies issue various policies.

CONCLUSIONS AND SUGGESTIONS

The implementation of Teaching Factory in SMK can be measured based on several criteria. The following are the parameters for the implementation of the Teaching Factory based on the *7x7 Assessment Parameter For Implementation Of Teaching Factory*.

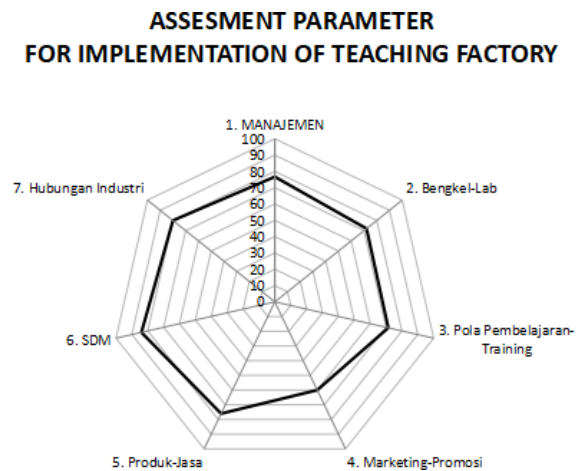


Figure 3. *Assessment 7x7 Parameters For Implementation Of Teaching Factory*

The assessment of the implementation of the *Teaching Factory* is based on the parameters above, not only in the learning process, but in a comprehensive or integrated manner. There are seven aspects evaluated, namely: management, workshop-lab, learning-training, marketing-promotion, product-service, Human Resources (HR), and industrial relations. In order for all aspects to run smoothly, the steps that must be implemented by SMK include the following:

- a. Application of block schedule. In *Teaching Factory learning activities*, SMK has the right to apply block system learning in scheduling the teaching and learning process for both normative, adaptive and productive subjects (or now known as group A, B, and C subjects). The implementation of the SMK block system schedule can be done by dividing learning activities every three months. Where there is a division, namely the normative-adaptive subject group and the productive subject group.
- b. The practical tools used are in accordance with the tools in the industry. This is done so that there are no differences in the tools used by students at school and in industry. In addition, with the equation of the tool there will be no competency gaps that must be possessed by students, the products and services produced are also in accordance with the industry.
- c. Setting the layout of tools and workshops according to industrial conditions. Implementation of *Teaching Factory* is setting up or setting up a workshop to suit industrial conditions. It is intended that when students carry out practical activities, the industrial atmosphere is felt and students use the workflow in accordance with the workflow in the industry. The hope is that when students work in the industry, they are familiar with the conditions of the workshop and the movement of work to use every tool in the workshop. In addition, industrial work culture can be applied consistently to practical activities in schools with workshops whose layout is arranged according to conditions in the industry.
- d. Product mapping is in accordance with basic competencies and is interrelated with other subjects. *Teaching Factory learning* produces finished products both within the scope of one subject or a combination of one subject with another. If in one type of lesson, the type

- of product is determined and then adjusted to the basic competencies used. If one type of product is a combination of the basic competencies of several subjects, the mapping is carried out based on the type of product, then a related basic competency matrix is made.
- e. Usefulness product results. The results of the practice carried out by students are products that have benefits, whether they are used to meet internal needs or are orders from external parties.

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