



## Development of Teaching Factory Model At Vocational High School (VHS) In Indonesia

Diana Nur Azizah<sup>1</sup>, Supari Muslim<sup>2</sup>, Ratu Noorita Achmad<sup>3</sup>, Dhanu Lukmanto<sup>4</sup>, Umi Farida<sup>5</sup>, Argo Ciptono<sup>6</sup>, Joko Joko<sup>7</sup>

<sup>1</sup>Electrical Engineering Education, Surabaya State University, Indonesia  
email: [diananurazizah2105@gmail.com](mailto:diananurazizah2105@gmail.com)

<sup>2</sup>Electrical Engineering Education, Surabaya State University, Indonesia  
email: [supari.muslim@gmail.com](mailto:supari.muslim@gmail.com)

<sup>3</sup>Management of Economic, Universiti Tun Hussien Onn, Malaysia  
email: [rita\\_timoho@yahoo.com](mailto:rita_timoho@yahoo.com)

<sup>4</sup>Computer Engineering Education, Universiti Tun Hussien Onn, Malaysia  
email: [Dhanu.lukmanto@gmail.com](mailto:Dhanu.lukmanto@gmail.com)

<sup>5</sup>Management of Economic, (STIE) Amkop Makasar, Indonesia  
email: [farida.unm@gmail.com](mailto:farida.unm@gmail.com)

<sup>6</sup>Mechanical Engineering Education, Universiti Tun Hussien Onn, Malaysia  
email: [argo.ciptono@yahoo.com](mailto:argo.ciptono@yahoo.com)

<sup>7</sup>Electrical Engineering Education, Surabaya State University, Indonesia  
email: [joko@unesa.ac.id](mailto:joko@unesa.ac.id)

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**Abstract.** Vocational education has an important role in the effort to create a workforce that has competencies that are in accordance with the needs of the industrial world. But the open unemployment rate in Indonesia in February 2018 was 6.87 million people and 8.92% of them were graduates of VHS. Why does that much unemployment happen? Is the learning process at VHS not yet qualified, so that the quality of VHS graduates is still low? Can the teaching factory improve the quality of VHS graduates? To answer this question, research needs to be done. This research was conducted using literature studies on related references, and a number of research reports on teaching factories conducted at VHS and continued with FGD. The results of the study concluded that the teaching factory consisted of planning, organizing, implementing, and evaluating. The teaching factory developed was integrated with the production unit that was used for the practice of students, so that VHS graduates became qualified and ready to enter the workforce.

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#### Keywords:

Model of teaching factory, management of teaching factory, production unit, vocational students.

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#### Corresponden author:

Diana Nur Azizah

Postgraduate, Universitas Negeri Surabaya, Jl. Ketintang No.30, Ketintang, Gayungan, Kota Surabaya, Jawa Timur 60231, Indonesia

Email: [diananurazizah2105@gmail.com](mailto:diananurazizah2105@gmail.com)



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## INTRODUCTION

Vocational high school (VHS) as one of the secondary education institutions aims to: (1) prepare students to continue to higher education; (2) increasing the ability of students as the citizens of the community in conducting reciprocal relations with the surrounding social cultural and natural environment; (3) increasing the ability of students to develop themselves in line with the development of science, technology and art; and (4) preparing students to enter employment and develop professional attitudes.

Vocational education has an important role in the effort to create a workforce that has competencies that are in accordance with the needs of the industrial world. But the open unemployment rate in Indonesia in February 2018 was 6.87 million people and 8.92% of them were graduates of VHS (Munandar, 2018). Why does that much unemployment happen? Is the learning process at VHS not yet qualified, so that the quality of VHS graduates is still low? Can the teaching factory improve the quality of VHS graduates?

As the Vision of the Directorate of Vocational Development, namely: "The implementation of excellent vocational secondary education services to establish vocational graduates who are entrepreneurial, intelligent, work-ready, competitive, and have a national identity. and able to develop local excellence and be able to contend in the global market. "One of the efforts made by the Directorate of Community Participation to achieve this vision is that VHS is expected to implement teaching factory programs. One of the link & match policies with value-added insight requires that the VHS process and produce graduates who have an entrepreneurial spirit. The link & match program that can generate added value by way of the teaching factory program where it can be implemented in all existing expertise programs in Vocational Schools (Community Participation Strategic Plan, 2010-2014). Questions: (1) how should factory teaching model learning be developed? (2) Can the development of teaching factory model learning be integrated into the production unit organized by the school? To answer this question, research needs to be done with the

title "Development of learning model teaching factory vocational high school (VHS) in Indonesia"

Teaching Factory Program is a concept of learning in a real atmosphere so that it can bridge between competence needs industry and the knowledge taught by the school. The teaching factory program is combination of existing learning namely Competency Based Training (CBT) and Production Based Training (PBT), namely learning that is designed and applied based on actual procedures and working standards to produce products that meet market needs, so that vocational graduates are expected can compete in the era of the Asean Economic Community (MEA).

Moerwismadhi (2009: 2) revealed that in the teaching factory, schools carry out production or service activities that are part of the teaching and learning process. Thus schools must have a factory, workshop or other business units for learning activities. Whereas according to Sudyanto (2011: 5) that, teaching factory program is a learning activity by carrying out production activities in the form of products or services within the school education environment by students. Optimizing the application of school teaching factories is expected to be able to develop students' competencies in appropriate with the characteristics of the needs of the industrial world. In addition, the school benefited both in terms of teacher competency development and the implementation of a profit-based business development system. The basic principle of teaching factory is the integration of work experience into the school curriculum, where all equipment, materials and educational actors are designed to carry out the production process in order to produce goods or services (Lamancusa, John S., et al., 2008).

Teaching factory program is the development of a production unit, namely the application of a partner industrial system in the existing production units in the Vocational School. Production units are the development of school business fields in addition to increasing school income that usable in the effort to maintain equipment, increase human resources, etc., provide truly real work experience for their students. The implementation of the production unit itself

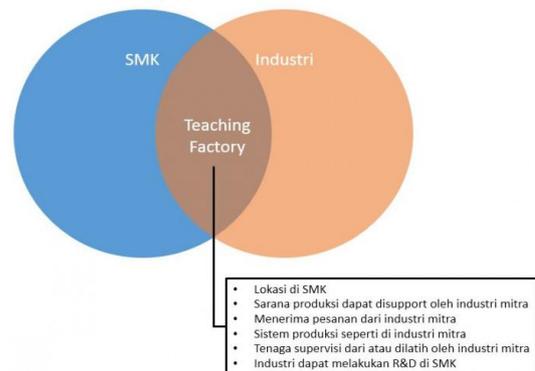
has a legal basis, namely Government Regulation Number 29 of 1990 article 29 paragraph 2, namely "To prepare Students of vocational high school to become workers, production units that operate professionally can be established in vocational secondary schools."

Teaching factory learning aims to (1) prepare vocational school graduates to become workers, and entrepreneurs, (2) develop character and work ethic, (3) help students choose work fields in appropriate with their competencies, (4) foster student creativity through learning by doing, (5) providing skills needed in the world of work, (6) expanding the scope of recruitment opportunities for VHS graduates, and (7) helping vocational students in preparing themselves to become laborers, and helping to establish cooperation with the actual world of work, as well as improving the quality of learning outcomes from just competency based training to learning that provides the ability to produce products (services based on training).

The cooperative relationship between Vocational School and industry in the teaching factory learning pattern will have positive impact on building a systematic and planned partnership mechanism based on a win-win solution. The application of teaching factory learning patterns is the world interface of vocational education with the industrial world so that checks and balances occur in the education process in Vocational Schools to maintain link & match with labor needs market in the industrial world.

In line with that, Sudyanto [2011: 5] asserts that factory teaching is an activity of students in learning, through production activities, either in the form of goods or services in the school environment. Teaching Factory is a forum, atmosphere, activity and place of learning that combines school curriculum and industry assignments. In teaching factory activities, there are interactions between teachers, experts/ technicians from the industry, and students who learn to use tools, instruments, procedures and work methods in an industrial environment in a real way, in processing and producing goods and or services that are worth selling. on certain industry product standards.

Conceptually the partnership relationship between VHS and Industrial World (IW) As is shown in figure 1 below.



**Figure 1.** The Concept of Partnership between VHS and Industrial World (Source: Directorate of Vocational Development of the Ministry of Education and Culture, 2018).

As is shown in figure 1, that the implementation of factory teaching was carried out based on mutual interests so that: (1) the location of teaching factory implementation was carried out in Vocational Schools; (2) production facilities can be supported by partner industries; (3) accept orders from partner industries; (4) production systems such as in partner industries; (5) supervision staff from and trained by partner industries; and (6) industries can conduct research & development in VHS. Thus the implementation of teaching factory will benefit both parties. The application of teaching factory is combination of the concept of Competency-Based Training (CBT) and Production-Based Training (PBT), is a learning model that is designed and applied based on actual procedures and working standards to produce products that fulfill the needs of society in general.



**Figure 2.** Integration between CBT and PBET concepts in Application of Teaching Factory (Source: www.gurucanggih.com, 2017)

In its implementation, the steps taken by school are as follows:

First: the implementation of CBET Learning is directed to PBET, which then continues to the teaching factory, with the understanding that a process of expertise or skill (life skill) is designed and applied based on actual procedures and working standards to produce products that in appropriate with market/consumer demands. Therefore, to achieve the highest competence, Jobsheet must be designed and applied based on actual work procedures and standards to produce quality products in appropriate with market demands. Changes to the applicable curriculum need to be held in order to fulfill the SKKNI and adjustments to the implementation of learning applied to the teaching factory;

Second: provision of learning materials in form of reading materials, media, or visual aids, or other supporting tools. To succeed in developing the teaching factory in this vocational school, learning materials need to be prepared and held in full, so that the learning process is not hampered by the deficient of learning materials;

Third: implementation of learning systems carried out in Schedule Block which is a grouping of effective learning hours in units of time summarized so as to enable students to follow and receive learning material to the fullest and maximum;

Fourth: craft Development and Entrepreneurship. To provide added value for secondary education students, each student needs to gain insight, into craft and entrepreneurship. With this insight they can develop their knowledge of being a creative and entrepreneurial spirit. For this reason, the central and regional governments need to collaborate with the business and industry, as well as banking so that graduates who will open their entrepreneurship will gain support from experience and finance so students have an entrepreneurial spirit that will be applied either as entrepreneurs or as productive workers. have an entrepreneurial spirit, so as to be able to increase the competitiveness of company and at the same time increase the human resource needs that will have positive impact on the decline in the number of unemployed.

In appropriate with the teaching factory guidelines of Teaching Factory

Coaching Program, 2016, the implementation of teaching factory consists of 4 models, which can be used as an instrument for mapping VHSs that have implemented teaching factories. The four models are as follows:

First: Dual System form of industrial work practices, namely the pattern of vocational learning in the workplace known as experience-based training or enterprise based training;

Second: Competency Based Training (CBT) is a learning approach emphasis on developing and improving skills and knowledge students according to job requirements. In this method, student assessment is designed so that it can ensure that each student has achieved skills and knowledge needed in each unit of competency taken;

Third: production Based Education, and Training (PBET) is Production learning based approach. Competence that have been owned by students need to be strengthened and their skills ensured by providing knowledge of making real products required by the workforce ( industry and society).

Fourth: teaching factory is the concept of industry-based learning (products and services) through school and industry synergies to produce graduates who are competent with market needs.

## **METHOD**

This research was conducted through a literature review of references and relevant research results and continued through focus group discussion (FGD). Relevant references include the policies of the Government of the Republic of Indonesia and books on vocational and vocational education. While the study of the results of relevant research is a study of studies related to the teaching model of teaching factory in VHS.

## **RESULTS AND DISCUSSION**

The Teaching Factory learning model has elements or various components that support the smooth running of the production process. In its implementation, the teaching factory contains 11 components (Directorate of Community Participation, 2008), including operational management, human resources,

financial, capital investment, entrepreneur, partnership, curriculum, The learning process the realization of the product, infrastructure, facilities, product/service. According to Haris (2013) research, factory teaching-based learning will work effectively, if the teacher develops: (1) continuous knowledge, skills, and experience; (2) have strong character; (3) have and use an active learning model.

The learning process with the teaching factory concept is a learning process that presents the business / industrial environment into the school environment. Through the direct learning process and having the same characteristics as the industrial world, students will: (1) gain more in-depth experience about the work that has been done; (2) obtain very large results because they directly carry out the work process in real time and experience the learning process directly. For this reason: (1) meetings between schools and industries that contain a series of evaluation activities on the curriculum, competency tests and discussion of constraints that need to be addressed and resolved; (2) preparation of curriculum that appropriate with the objectives of the Vocational School, as a set of plans and arrangements regarding the objectives, contents, and learning materials and the methods used as guidelines for implementation. Therefore, according to Chryssolourisa, Mavrikiosa, Rentzosa (2016) that the use of teaching factory is a two-way communication media between academics and industry. The paradigm teaching factory provide a real-life environment for students and researchers to develop their skills and understand the challenges faced in everyday industrial practice.

The factory teaching program can run if the facilities and infrastructure owned by the school meet the standards for conducting production activities in the form of products or services in accordance with a predetermined educational program. The facilities and infrastructure that must be owned by the Vocational School are standard training workshop facilities, advanced training workshops, and teaching factories. Standard training workshop facilities are minimum standards that must be possessed so that learning activities are in appropriate with the curriculum, while advanced training workshops are places for learning activities, while teaching factory is facility devoted to

production activities in the form of products and services.

In connection with this, Siswanto (2011: 127-129) conducted research at the RSBI Vocational School, Yogyakarta, which found that the implementation of teaching factory has several supporting and inhibiting factors in an effort towards success and achieving the goals set by the school. Supporting factors include: (1) good facilities and equipment, (2) human resources, (3) grant funds from the center/region, (4) location, (5) products produced, (6) clear market share, (7) leadership, (8) marketing; While the inhibiting factors of teaching factories include: (1) rules regarding the legalization of production units; (2) marketing; (3) parental perceptions; (4) the price of the producer is too high; (5) busyness of teachers and students; (6) the quality of student work; (7) management motivation, (8) communication between teachers; and (9) long product delivery times.

In addition to the findings of Haris (2013), and Siswanto (2011), there are still several other studies on the teaching factory. HeriSantosa (2018) through a study entitled "Management of Teaching-Based Learning Factory for Boutique Clothing Competency Programs at Susukan Muhammadiyah Vocational School Semarang Regency" reminded that the selection of teachers does not only consider academic factors but also experiences the industry concerned. The attitudes and knowledge formed since their internship in the industry provided their own advantages in the implementation of teaching factory. Because they are used to the work atmosphere in the industry. Given that some of the experiences that teachers have tended to be on improvement and the products developed are also new products, the teacher must adjust to the implementation of school teaching factory. The teaching factory supports professional teachers to create marketable orders and the production process is carried out by students (Dadang, 2012).

The process of teaching factory must involve students in full so students have good competence and have an entrepreneurial spirit before plunging into the industrial world. The learning process can provide meaningful results if students are an active, constructive, incentive, cooperate, and work in real activity. Students prefer to obtain direct and

real experience rather than listening to lectures from a teacher in a book or presentation.

Through direct experience, the competencies obtained will always be remembered by students in a long period of time after experiencing the learning process. Teaching factory gives the ability for students to deepen their knowledge on certain topics applied in practice, work with deadlines according to industry regulations (Chryssolouris et al, 2016). Therefore, Wijaya (2013) reminded that the management model of the Vocational teaching factory In accordance with the needs of business and industry need formulated and tested together with the model groups (teachers, managers of Vocational Schools, and stakeholders/industry).

From an industry standpoint, teaching factory learning provides ideas and solutions that can be considered during the problem-solving process found in the company. Industrial people have the opportunity to do so interacting with students who can provide problem-solving ideas. Teaching factories encourage entrepreneurship in schools and innovation within the company through joint projects between academics/schools and industry (Chryssolouris, et al, 2014). In addition, to further develop teaching factory learning, it must have many partners in order to expand the network that integrates the cornerstone of the knowledge base in form of education, training, and research.

Furthermore, in terms of the implementation of teaching factory, Nurtanto, Ramdani, Nurhaji (2017) reported the results of his research through a journal entitled "Development of Teaching Factory Models in Vocational Schools" that the implementation of the teaching factory consisted of three processes namely the preparation process, the learning process, and evaluation process. The preparation process that needs to be made includes the management of facilities and equipment (tools and machinery) and management of the room. The practical learning process is conducted in school workshops and involves production units. The practical process involves students in full starting from the preparation process, practicum process, and the final process of practical activities. The types of practical activities carried out no longer use object training systems but carry out the practice

directly on a real object. All practical learning processes carried out are carried out based on the concept of implementing the teaching factory. The evaluation process is carried out through direct observation on the process and the results of student work by using observation sheets and evaluations based on the vocational skill competency guideline (UKK) which is presented in form of a practice test.

On the other hand, vocational students will have high entrepreneurial readiness, if they study entrepreneurship in schools and the real world of entrepreneurship, so they have inspirations and concrete examples of entrepreneurship in order to pioneer and build a meaningful future career better. Some studies have found that management and implementation of factory teaching-learning can improve the competence students of vocational high school (VHS). In line with these thoughts, Barab&Landa stated that when students link academic subjects and apply them in real-world situations, they find meaning and remember lessons, so their IQ increases (Johnson, 2014, p.121). Working with training tools allows students to acquire practical knowledge and skills and then use those skills for problem-solving encountered (Muslim, 2018).

Especially in teaching factory based learning, there are group assignments, where students need discussion. Such group discussions, require collaboration, share tasks and responsibilities to complete tasks (Muslim, 2013). Collaboration can eliminate mental barriers due to the limited experience and perspective (Johnson, 2014, p. 164). Paying attention to the many benefits of teaching factory learning process, it's best to face challenges in industry 4.0 and reduce unemployment rates, preferably the teaching factory learning model is conducted in many vocational high schools (VHS).

## **CONCLUSIONS AND SUGGESTION**

Based on a study of literature and relevant research results, conclusions are obtained as follows: (1) teaching factory is an industry-based learning model that utilizes production units as a place to run the production and business processes; and (2) teaching factory developed integrated with the

production unit as a place of practice for Vocational students, through teaching factory management which consists of planning, organizing, implementing, and evaluating.

Based on the above conclusions, the following recommendations are conveyed: (1) teaching factories need to be prepared jointly between schools and industry in the context of the suitability of education programs and resource sharing needed; (2) in the process of implementing the factory teaching need to compile a curriculum that is in appropriate with the objectives of the Vocational School, and teacher selection is not only considered from academic factors, but also from the experience of the industry concerned; and (3) the teaching factory program can run well, if facilities and infrastructure owned by the school meet the applicable standards.

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