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Teaching Factory Management to Develop the Qualified Graduates at Marhas Margahayu and Assalam Vocational Schools (Excellent School Programs) In Bandung

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Abstract

Vocational high schools have an important role in efforts to produce a workforce that has competencies that are in accordance with the characteristics and needs of the industrial world. The learning process that emphasizes the mastery of specific competencies requires an appropriate and appropriate learning model. Modelteaching factory is one of the solutions to prepare students to have competencies in accordance with the competency needs of the industrial world. This study aims to determine (1) management teaching factory in terms of: planning, organizing, implementing, monitoring and evaluating; (2) knowing the supporting and inhibiting factors of management teaching factory to improve the quality of graduates at Marhas Margahayu And Assalam Vocational Schools (Excellent School Programs). This research is qualitative research in which data collection techniques include interviews, observation and documentation studies. Data analysis techniques used descriptive qualitative analysis including data collection, data reduction, data display and data verification. The results of this study: (1) management teaching factory in Marhas Margahayu And Assalam Vocational Schools (Excellent School Programs)in terms of (a) planning has been carried out such as administering time, tools and materials practice; (b) organizing teaching factory well-organized starting from study program heads, workshop heads, and subject teachers; (c) implementation has been carried out properly; (d) supervision is carried out in an integrated manner by all school management. (2) constraints teaching factory includes: rigid syllabus, inadequate tools/infrastructure, insufficient time and competent human resources/teachers who are competent in supporting the implementation teaching factory

Keywords

management,teaching factory, graduate quality

Introduction

World technology is currently experiencing very rapid development and greatly affects the world of business, industry and even personal life. According to Schwab (2016) presented at the world economic forum, the transformation that occurs as a result of technological developments is considered large-scale and complex, and has never even been experienced in history. The transformation that Schwab means is the fourth industrial revolution or what we know as Industry 4.0. This revolution, according to Schwab, certainly has an impact on all aspects of human life.

The term Industry 4.0 for the first time echoed at the Hannover Fair, 4-8 April 2011. This term is used by the German government to advance the industrial sector to the next level, with the help of technology. German Chancellor, Angela Merkel, at the 2015 WEF annual meeting, explained that Industry 4.0 is integrating the online world with industrial production. In short, imagine a smart factory in which machines and robots are capable of performing complex tasks, exchanging information, giving and receiving orders automatically without human involvement. All of these production processes run with the internet as the main support. All objects are equipped with sensor-assisted technological devices capable of communicating independently with information technology systems.

Regarding number four, the main theme of WEF Davos 2016 clearly mentions 'industrial revolution fourth'. If you look at history, the first industrial revolution occurred in the 18th century, when steam-powered machines were invented, which made humans switch from relying on animal power to mechanical production machines. The second industrial revolution took place around 1870 when the world's industry turned to electric power capable of creating mass production. The third industrial revolution occurred in the 1960s when electronic devices were able to bring about production automation. Now, the world's industry and manufacturing are facing the fourth industrial revolution, Industry 4.0.

This has an impact on the number of world unemployment which is predicted to swell. Smart factories as products of Industry 4.0 almost do not require human labor. Machines and robots to replace human power will be present. Sure enough, the Industrial 4.0 wave still leaves room for human labor, but this is very limited to only skilled workers. The impact is more worrying, welfare will only be concentrated in countries or companies that are able to present smart factories. World unemployment is almost certain increases precisely when welfare is concentrated in a handful of economic elites. "Without early countermeasures, to anticipate the short-term impact of the transition to Industry 4.0, and efforts to produce skilled workers, governments in many countries are likely to have to face very high unemployment rates and welfare imbalances," said Schwab in the WEF report titled*The Future of Jobs*. Moreover, without the emergence of Industry 4.0, the increasing number of world unemployment

is already looming. The world of work is growing from year to year, so the demands of vocational schools are getting tougher in meeting the demands of the world of work. Education in SMK requires innovations in developingSkills more broadly so that it is useful for students to compete in the world of work. Billet (2011: 57/59) reveals several ways to meet the needs of the world of work, namely:*"…(a) the need for skilled workers, (b) a more educated youth and (c) the engagement of young people with civil society"*. From Billet's statement, in order to meet job requirements, it requires (a) the need for skilled workers, (b) a more educated youth, and (c) the involvement of the younger generation in civil society. Vocational high school (SMK) is a vocational education which aims to prepare students to be able to work, either independently, or to fill existing job vacancies as middle-level workers in accordance with their competencies (Law No. 20 of 2003). As a consequence of the goals of SMK, SMK is required to be able to equip its graduates with a set of competencies that are in line with the needs of the workforce/industry. Thus, the SMK education program is more oriented towards efforts to develop students' abilities to be able to carry out certain types of work in industry. The importance of providing skilled human resources (HR) is realized by the government through a policy to improve the quality of vocational education which pays attention to Vocational High Schools (SMK). The development of SMKs is currently starting to move from a local labor market orientation to the ASEAN labor market in welcoming the ASEAN Economic Community (AEC), as well as preparing graduates with entrepreneurial character *(entrepreneurship)*. Application Teaching *factory* in SMK or the old language of the production unit (UP) is a form of one of the efforts of the Directorate of Vocational Development to further strengthen cooperation or synergy between SMK and industry.

Teaching Factory (TEFA) is a learning concept in an industrial setting, so that it can bridge the competency gap between industry needs and knowledge school (Wibowo, 2016; Kamano, Patitad, & Watanabe, 2023). *Teaching factory* is the development of a production unit, namely the application of partner industrial systems in production units that already exist in SMKs. The production unit is the development of the school's business sector in addition to increasing the school's income which can be used in efforts to maintain equipment, improve human resources, and so on, as well as to provide real work experience to students. Implementation of the Teaching *factory* very much depends on the management that has been done. When a management teaching *factory* has been carried out properly which includes planning, organizing, implementing, and supervising, then this will be carried out effectively professionally.

Kuswantoro (2014: 22) states,*teaching factory* become a learning concept in real situations to bridge the competency gap between the knowledge provided by the school and the needs of the industry.*Teaching factory* is the development of a production unit, namely the application of partner industrial systems in production units that already exist in SMKs. The production unit is the development of the school's business sector in addition to increasing the school's income which can be used in efforts to maintain equipment, improve human resources, etc. It is also to provide real

work experience to students. The implementation of self-production units is based on Government Regulation Number 29 of 1990 article 29 paragraph 2 namely "To prepare vocational high school students to become workers, in vocational high schools a production unit can be established that operates professionally

Learning through teaching *factory* aims to grow and develop the character and work ethic (discipline, responsibility, honesty, cooperation, leadership, etc.) needed by DU/DI and improve the quality of learning outcomes rather than just equipping competence*(competency based training)* towards learning that equips the ability to produce goods/services*(production based training)*. The cooperative relationship between SMK and industry in learning patterns*Teaching Factory* will have a positive impact on establishing a cooperation mechanism*(partnership)* systematically and planned based on bargaining position win-win *solutions*. Application of learning patterns teaching *factory* is the interface between the world of vocational education with the world of industry, so it happened to check *and balance the* educational process at SMK to maintain and maintain harmony *(link and match)* with the needs of the labor market.

B. Research Methods

The method used in this study uses a qualitative approach. Qualitative research is research that describes the data collected in the form of words or pictures rather than numbers. This qualitative research was chosen to describe a management teaching *factory* to improve the quality of graduates at Marhas Margahayu And Assalam Vocational Schools (Excellent School Programs). This method is also known as the artistic method, because the research process is more artistic (less patterned), and is called the interpretive method because the research data is more concerned with the interpretation of the data found in the field (Sugiyono, 2012: 7).

The time for the research to be carried out is several months in 2023. The research starts from collecting data, to preparing a research report. This research was conducted at Marhas Margahayu And Assalam Vocational Schools (Excellent School Programs), which are located at Jl. Kopo Canal No.385/299 Bandung Regency and Jl. Cibaduyut, Cangkuang kulon, kec. Dayeuhkolot, Bandung Regency. Researchers choose teaching *factories* in Marhas Margahayu And Assalam Vocational Schools (Excellent School Programs) as a place of research because they both apply teaching *factories* at school.

Data collection techniques in this study used interviews, observation and document studies. An interview is a meeting of two people to exchange information and ideas through question and answer, so that meaning can be constructed in a particular topic (Sugiyono, 2012: 53). In this research activity, the researcher conducted interviews with the Head of the Study Program (Kaprodi), Advisors and Pioneers Teaching *factory* in both SMKs, teachers and workshop heads related to management teaching *factories* in an effort to improve the quality of graduates.

The object of observation in management research teaching *factory* to

improve the quality of graduates at Marhas Margahayu And Assalam Vocational Schools (Excellent School Programs), among others: a) Practicum of Mechanical Engineering and Light Vehicle Engineering (TKR); b) Head of study program; c) head of workshop/teacher; d) Students; e) Activity management activities teaching *factory*; f) Objects in the form of Practicum documentation; g) Situations and conditions when the research took place with observation guidelines.

Before conducting data analysis, the first step taken by researchers is data collection. Data collection is done by looking for valid and consistent data, in order to obtain credible data. Then the next step is data reduction choosing the main things, then presenting the data and finally drawing conclusions (Miles and Huberman, 2005). Data analysis techniques in this study used interactive analysis techniques, starting from collecting data regarding learning teaching *factories*, then the data is reduced, after being reduced the data is presented and the last one is verified. To test the validity of the data is done by means of triangulation. Triangulation is a data collection technique that combines various data collection techniques and existing data sources (Sugiyono, 2013). This study uses source triangulation and method triangulation. Source triangulation is done by comparing information through observation, interviews and documentation. While the triangulation method traces the truth information obtained from several data sources. From the results of this study, data evidence will be obtained in accordance with the phenomenon under study. The research was conducted at Marhas Margahayu And Assalam Vocational Schools (Excellent School Programs), conducted from a management teaching *factory* to improve the quality of graduates. From the results of interviews, observation and documentation, the following results were obtained.

C. Findings

Findings at Marhas Margahayu And Assalam Vocational Schools (Excellent School Programs)

Bandung Vocational School 1. Planning (Planning)

Planning Teaching *factory (TEFA)* at Marhas Margahayu Vocational Schools (Excellent School Programs) before the KBM, of course, the school was together stakeholder hold a joint meeting to determine learning through curriculum alignment with IDUKA to compile lesson plans and syllabus, and the teacher determines the Minimum Completeness Criteria (KKM). Furthermore, the Marhas Margahayu (Excellent School Programs) through the MSM Institution (marhas synergy manufacturer) made an agreement (MOU) with IDUKA to encourage continuous orders. Exploration of the MOU has been under way with CV. CAKRA KARYA TECHNICAL, CV ARSYL MAHREEN MANUNGGAL. CV parties give orders to schools that are produced by the production unit. This is part of the school's efforts to develop a sustainability teaching *factory*.

Furthermore, almost the same as planning a teaching *factory* at Marhas Margahayu Vocational Schools (Excellent School Programs), planning teaching *factory* at Assalam Vocational Schools (Excellent School Programs) starting from preparing various learning tools such as syllabus, lesson plans, preparing media and preparing assessment instruments before carrying out the learning process. The syllabus is implemented for adjustment to the 2013 curriculum that has been implemented by the school. The syllabus is described based on a curriculum that is adapted to the conditions, characteristics, potential of the school or also called an implementation syllabus. In planning learning teaching *factory* light vehicle engineering competence (TKR), the determination of KI/KD for each subject must support the activity teaching *factory*.

In addition, the Assalam Vocational Schools (Excellent School Programs)has formed a Corporation (MOU) with IDUKA to encourage sustainable collaboration. MOU assessments have been underway with various automotive industry brands such as Daihatsu, Mazda, Toyota, Mitsubishi, Honda, Mercedes-Benz, Kia, Ford and Chevrolet

2. Organizing (Organizing)

Results of organizing a research teaching *factory* at Marhas Margahayu Vocational Schools (Excellent School Programs) expertise technique machine is systematically arranged,coordination and cooperation between the head of the competency department and the head of the production unit, Marhas Synergy Manufacturing (MSM), productive teachers as well toolman goes well. There are administrative reports, organizational charts neatly arranged for joint reports to the school principal.

For organizing at Assalam Vocational Schools (Excellent School Programs), organizing/managing a teaching *factory* led by the head of study program and adviser as well as the pioneer teaching *factory* at Assalam Vocational Schools (Excellent School Programs). In addition, synchronization was also carried out with IDUKA on the competence of Light Vehicle Engineering (TKR) at Assalam Vocational Schools (Excellent School Programs). Curriculum synchronization with IDUKA at Assalam Vocational Schools (Excellent School Programs) is in other competency competencies.

3. Implementation (Actuating)

Implementation Teaching *factory* at Marhas Margahayu Vocational Schools (Excellent School Programs) it is planned to be divided into 4 models, which will be very useful in carrying out mapping, because it will be related to readiness to carry out teaching *factory*, model *teaching factory* are as follows:

a. First Models, Dual The system in the form of industrial work practices is a pattern of vocational learning in the workplace known as experience *based training* or enterprise *based training*.

b. Second Model, *Competency Based Training (CBT)* or competency-based

training is a learning approach that emphasizes the development and improvement of students' skills and knowledge according to job requirements. In this method, student assessment is designed so as to ensure that each student has achieved the skills and knowledge required for each competency unit taken.

c. Third Model, *Production Based Education and Training (PBET)* is a learning approach production based. Competencies already possessed by students need to be strengthened and their skills ensured by providing knowledge of making real products needed by the world of work (industry and society).

d. Fourth Model,*Teaching Factory (TEFA)* is the concept of industry-based learning (products and services) through the synergy of schools and industry to produce graduates who are competent according to market needs.

Unlike the Marhas Margahayu Vocational Schools (Excellent School Programs), the implementation teaching *factory* at Assalam Vocational Schools (Excellent School Programs)Learning is carried out by teachers and mechanics as instructors,use tools and products that have been adapted to these subjects, so as to produce the expected skills/services or ordered according to the order along with the learning scheme. The final result of the learning process teaching *factory* in the form of student expertise in the form of services. These skills should be worth selling or worth working so as to generate added value. During this time learning teaching *factory* it's still just a simulation. As for most of the projects done in schools, they are still in the realm of supporting publications and documentation teaching *factory* on other skills programs at school, in Assalam Vocational Schools (Excellent School Programs)is different, students are involved in working on the project, so students are familiar with the project walkthrough simulation or real work.

4. Monitoring/Evaluation(controlling)

Supervision of learning management teaching *factory* skill competency Technique. The machine at Marhas Margahayu Vocational Schools (Excellent School Programs) is carried out manually and integrated by all components of the school. Formally, management supervision is carried out by an education unit that monitors the implementation of management in schools. The implementation of supervision in schools is carried out by the head of the school and the head of MSM (Marhas Sinergi Manufaktur), especially in the production unit sector which has its own institution. For all learning in school supervision is carried out by the vice principal of the school. For example, the vice principal for the curriculum section is responsible for the implementation of learning, the vice principal for facilities and infrastructure is responsible for the facilities and infrastructure in the school. This will be reported by the six vice principals to the school principal. which will later evaluate the implemented program. Meanwhile, direct supervision of practicum is carried out by the chairman of the competence of expertiseTechnique Machines that will check and oversee the course of learning activities teaching *factory* on competency skillsTechnique Machinery at Marhas Margahayu Vocational Schools (Excellent School Programs).

Same as in Marhas Margahayu Vocational Schools (Excellent School Programs), Supervision of learning management teaching *factory* skill competencyTechnique Light Vehicles (TKR) Vocational Schools (Excellent School Programs) peace be upon you Bandung is done automatically integrity and integrated by all components of the school. Formally, management supervision is carried out by an education unit that monitors the implementation of management in schools. In addition to evaluation in the workshop, the head of the workshop routinely reports all workshop activities to the school principal.

D. Discussion

Teaching factory learning is a production/service-based learning concept in vacational school that refers to the standards and procedures that apply in the industrial world, and is carried out in an atmosphere like what happens in the industry. This is according to the characteristics of education vocational education itself, namely: (1) preparing students to enter the workforce; (2) based on the needs of the world of work"*market driven demand"*; (3) mastery of competencies needed by the world of work; (4) student success in"*hands on"* or world of work performance; (5) close relationship with the world of work; (6) responsive and anticipatory towards technological advances; (7)*learning by doing* and hands *on experience*; (8) requires greater investment and operational costs than general education (Herminarto Sofyan, et al, 2017: 112-113).

Application Teaching *factory* optimally in SMK both Marhas and Assalam are expected to be able to develop the competence of students in accordance with the characteristics of the needs of the industrial world, because through the model*teaching factory* students not only learn how to master a competency, but can also gain valuable experience running and operating tools that are suitable for the industrial world, so that after graduation students are easily absorbed by the real industrial world.

According to Lamancusa (2008: 5-7), there are three basic things from the concept teaching *factory*, including: (1) mediocre learning is not enough, (2) student benefits are obtained from hands-on practical experience, and (3) team-based learning experiences that involve students, teaching staff and industrial participation enrich the educational process and provide significant benefits. real for everyone.

In addition, based on the research conducted, there are 4 (four) sources of problems/obstacles to implementation teaching *factory* at Marhas Margahayu And Assalam Vocational Schools (Excellent School Programs), including:

1. Syllabus

Syllabus is often made or placed like a holy book, which should not be changed, even though the syllabus should be adaptive/dynamic to technological changes and developments. This is an obstacle in the implementation teaching *factory* at Marhas Margahayu And Assalam Vocational Schools (Excellent School Programs).

2. Tools/Infrastructure

Tools/means infrastructure not proportional to the number of students, so students have to take turns to practice using the tool that resulted in hours of practice automatically circumcised/reduced.

3. Time

A lot of time is wasted due to the lack of tools/infrastructure owned by the school. For example, schedule practice students from 7 to 9.30, these hours are shared with all students, so that each student only has a little time for them to carry out activitiesBecause have to alternate.

4. HR/Teacher

Many teachers lack experience, or it can be said that few teachers have expertise. Sometimes teachers only master theory, but lack experience.

E. Conclusion

Management Teaching *factory* in Marhas Margahayu And Assalam Vocational Schools (Excellent School Programs) in general, still haven't fully implemented the concept teaching *factory* so in the planning model teaching *factory* in both SMK is not maximal. The Planning Teaching *factory* has actually been well planned, as well as the implementation, organization and evaluation. For example, planning teaching *factory (TEFA)* at the Marhas Margahayu Vocational Schools (Excellent School Programs)before the KBM, the schools were together stakeholder hold a joint meeting to determine learning through curriculum alignment with IDUKA to compile lesson plans and syllabus, and the teacher determines the Minimum Completeness Criteria (KKM). In addition to the preparation of lesson plans, teaching *factories* synchronize KI/KD with IDUKA. Analysis and synchronization of learning administration will be mapped for proposing the procurement of facilities, media or tools that support learning teaching *factories* To produce competent graduates, learning needs to be well organized according to the procedures set out in implementation governance teaching *factories*. Management Teaching *factory* it is necessary to establish a special organizational structure to determine the main tasks and functions of everyone involved. In improving the ability of teachers, especially those involved in management and implementation of teaching *factories*, schools must always motivate teachers to participate in upgrading both carried out by the central government and the private sector*(external).*

Learning Activities Teaching *factory* implemented with the system and job *desc* clear through job sheet which has been compiled in teaching learning planning factory. The system was built to make it easier for users to minimize human *error*. Implementation of learning teaching *factory* carried out by students with the guidance of the teacher as a learning instructor using the tools/media available at once quality *control* from the final results of learning, namely products

(goods/services).

The Learning Teaching *factory* can be carried out well if the Syllabus, Tools (infrastructure, time and human resources (HR)are qualified and support the implementation teaching *factory* itself. However, all of these elements are precisely the obstacles to implementing a teaching *factory* in both SMKs (Marhas and Assalam).

Although there is still a shortage in program implementation teaching *factories* in Marhas Margahayu And Assalam Vocational Schools (Excellent School Programs), the impact of the program teaching *factory* in both SMK is quite good. The impact on students is that the level of learning for practicum activities is increasing, and graduates are becoming more competent so that many graduates are needed by the industry. The impact for teachers is that learning activities become more enjoyable because practical activities resemble industries that can produce products/services that can be absorbed by the industrial world.

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