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Implementation and Challenges of Teaching Factory Learning at Vocational High School

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Abstract

Indonesia's now in the era of Industrial revolution 4.0 which has an impact on the development of Vocational High Schools. Vocational high schools are obliged to step forward and contribute to the industrial sector. Vocational High School is becoming the favorite destination of students to study and at the same time becoming the highest contributor to unemployment in Indonesia. The cause of the most of unemployment is lack of link and match between Vocational High School and the industrial sector which leads to mismatch of graduates to work in their own fields. The government revitalized Vocational High School by initiating teaching factory learning to overcome the challenge. This research is qualitative descriptive method using Nvivo 12 software to classify and display the results in the form of diagrams, graphs, and models. The findings of the research indicate that the implementation of the teaching factory in Vocational High School is match to the guidelines that have been carried out by the Ministry of Education and Culture. There are challenges in the aspects of learning, human resources, and facilities that cause the teaching factory learning process to not quite run well.

Keywords: *Teaching Factory; Vocational High School*

Introduction

The current era has brought the world to enter the huge revolution which is called by the industrial revolution 4.0. This revolution leads to a *shock effect* to all sectors, starting from industrial, government and even the education sector (Benešová & Tupa, 2017). Revolution 4.0 makes people have to be able to adapt to their demands, including in the industrial sector and the education sector. As the name suggests, the industrial revolution had a lot of influence on the industrial sector. Changes occur in the means of production, work culture, technology used and many aspects that require the industry to adapt. The adaptation process does not take place suddenly, adaptation requires Human Resources (HR) who have competence in their fields and are of high quality so that they are able to face the onslaught of the industrial revolution 4.0.

It cannot be denied that the education sector is able to graduate high quality human resources for the industrial sector since the industrial era 4.0 requires the education sector to develop based on the needs of this era (Wijaya et al., 2016). In Indonesia, each level of education has its own goals based on the regulations. Vocational High School (SMK) becoming the level of education which focuses on graduating graduates who are ready to work.

Vocational schools in Indonesia becoming favorite destination schools for students who graduate from junior high school. It was recorded that in 2018 the ratio of the number of senior high schools compared to vocational schools was 49.2%: 50.8% (Suharno et al., 2020). Based on the data, it seemed Vocational School graduates will contribute a lot of manpower to the industrial sector in Indonesia, but it turns out that in 2019 the contributor to unemployment was 10.42%. The number of unemployed is caused by the mismatch of skills possessed by students to the needed skills in the industrial sector.(Putri et al., 2017; Reys-Nickel & Lasonen, 2018). In addition, many non-specific industries require vocational graduates that affected to them to be inferior to Diploma or Undergraduates graduates (Suhartini et al., 2019). In the fact, Vocational School graduates can only work in lower positions, thus making Vocational High School considered as second-class school like in less developed countries (Mason et al., 2018).

Considering the problems in Vocational High Schools, the President of the Republic of Indonesia issued Presidential Instruction Number 9 year of 2016 concerning Vocational Revitalization to overcome the challenges. The instruction contains 5 areas of revitalization, covering curriculum, teachers and education staff, collaboration with industrial sector and industrial working, certification and accreditation, facilities and institutions.

One area that has become the concerning of discussion is in the curriculum by establishing teaching factory learning. Teaching factory learning is learning that is conceptualized as the actual working industrial conditions so that students are able to develop competencies and skills. Not all vocational schools can apply teaching factory learning because there are several factors that cannot be fulfilled.

Learning in Teaching Factory

Teaching factory learning is learning that is packaged in real conditions according to the student's work environment that similar to the environment they will face in the working industrial (Wafroturrohmah et al., 2020). *Teaching factory* learning is business and product oriented by integrating three important points; research, innovation and education (Chryssolouris et al., 2016). Research has objectives as an assessor of the effectiveness of *teaching factory* learning which will then bring up to the new innovations for education. Teaching factory learning arises because of the challenges of fully implementing the production-based learning model (Wulandari & Sudiyatno, 2019). Teaching factory allows students to apply the knowledge gained in the classroom into a direct process. The objective is to provide hands-on practical experience for students (Widiatna et al., 2019). The development of teaching factory learning can be in the form of opening an industrial business in schools by involving the industrial sector which is adapted to the conditions of the school environment (Marniati et al., 2020). Teaching factories can also be used by schools as a source to increase school income (Azizah et al., 2019).

Teaching factory learning was invented due to three factors; insufficient classroom learning, many benefits from teaching factory learning and collaborative learning enriching learning process itself (Diwangkoro & Soenarto, 2020; Gordon et al., 2006). The concept of this learning combines business concepts with skills relevant to the expertise program they have. The term of *teaching factory* is actually not a standard term for all educators. In some countries may have their respective terms. One of the educational institutions that explicitly states that they use term *teaching factory* -based learning is Nanyang Polytechnic.

Teaching Factory Learning in Indonesia

The *teaching factory* journey in Indonesia is not instant. There are various stages and changes to continue the development to the times. The following are the categories for implementing a *teaching factory* in Indonesia.

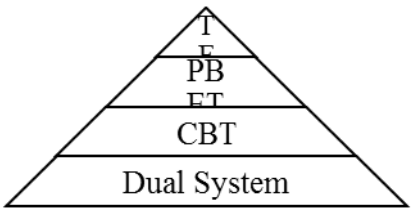

Figure 1. Learning Teaching Factory in Indonesia
Source: Direktorat Pembinaan Sekolah Menengah Kejuruan 2016

The first category that underlies the formation of the *teaching factory* is *dual system* learning or *doublel system* learning. The *dual system* category is a learning activity based on certain predetermined work processes. Meanwhile, during 1998-2005 the Directorate General of Vocational High Schools initiated competency- *based learning*. Learners learn based on certain competencies. Assessment to assess students is carried out in such a way as to ensure that the predetermined competencies are sufficient. When students have fulfilled the previous competencies, students have the chance to continue to the next stage of competence.

The third category towards *teaching factory* learning is PBET (*Production Based Education and Training*). The production learning model provides opportunities for students to develop their thinking, creativity, and cooperation (Kusumaningrum et al., 2015). In this learning process, students are expected to be active in asking questions and practicing the products they will create. This category makes learning and training places into a single unit that cannot be separated and becomes a unit system.

The series of correlation between CBT, PBET and the *Teaching factory* is that in CBT learning the products produced are only based on competence at school and are assessed based on the matching of the knowledge that has been given. In the PBET approach, the product is only fulfilling the needs of the certain institution. While at the *teaching factory* stage, the products produced by students is ready to be sold in the market since they already have a standard selling value.

In 2000 the *teaching factory* was introduced to Vocational High School. The introduction was a development of the production unit that previously existed. The challenge that has occurred recently is that the distribution of *teaching factories* in Indonesia has not been evenly distributed. Some schools are still implementing this production unit and have not been able to upgrade it to become a *teaching factory*.

Research Methodology

This research uses a qualitative approach with a phenomenological strategy. Technique used to collect the data are using interviews, observation and documentation. Interviews were conducted in a structured interview on a predetermined sample using snowball sampling. The information that had been collected through interviews was documented, transcribed and coded using Nvivo 12. The use of Nvivo 12 as an analytical tool was to reduce the subjectivity of the researcher. Nvivo 12 enables effective and efficient coding of data to produce in the form of graphs, diagrams, and output model.

Findings and Discussion

Teaching factory learning is an industry-based learning that is packaged in a real industrial atmosphere. The implementation of learning must cover 7 important components below:

1. Vocational School Conditioning
2. Product determination

3. Learning model
4. Human Resources
5. Management
6. Cooperation to industrial sector
7. Information on products, goods and or services

Teaching factory is very essential for Vocational High School since it functions in strengthening the competence of its graduates. It is expected that the broken chain due to the gap between what is needed by the industrial sector and the output produced by Vocational Schools can be overcome by teaching factory learning. This research was conducted at SMK N 6 Surakarta, which in 2018 through the vocational revitalization program implemented teaching factory learning in the Online Business and Marketing Expertise Program. This research will review the implementation, challenges, and supports from the industrial sector for teaching factory learning at SMK N 6 Surakarta.

Correlation Toward Industry

Teaching factory learning has objective to improve the competence of vocational students by involving them in learning with real conditions in the industrial sector. Basically, students are taught to learn and work. The creation of real learning will certainly require a role model in its implementation. The role model is the industrial sector with fields that are in matching with the school's field of expertise. One of the industrial sectors that has been collaborated with SMK N 6 Surakarta is Alfamart; one of the largest retailers in Indonesia which already has many outlets.

The industrial sector provides various supports with their abilities which will get feedback from the school. At SMK N 6 Surakarta, supports from the industrial sector is in the form of facilities and infrastructure, training for teachers, training for students, providing internship programs for students and monitoring the implementation of teaching factory learning. Support or cooperation from the industrial sector for vocational high school is in line with the opinion of (Aqli et al., 2019; Yunos et al., 2018). Industry also supports the process of synchronizing the Vocational School's curriculum toward Industry with the support in the form of guest teachers from industry and the provision of materials for developing the skills of teachers and students. The synergy between the industrial sector and the school will lead into a match between the teaching factory in the school and the industrial sector. The teaching factory at SMK N 6 Surakarta has a variety of compatibility with the industrial sector which is increasingly becoming a plus value for students and schools. This conformity is like customer service standards which have the same standards as industrial partners, have the same layout as the industrial sector, and have the similar work culture with industrial partners.

Teaching Factory Implementation

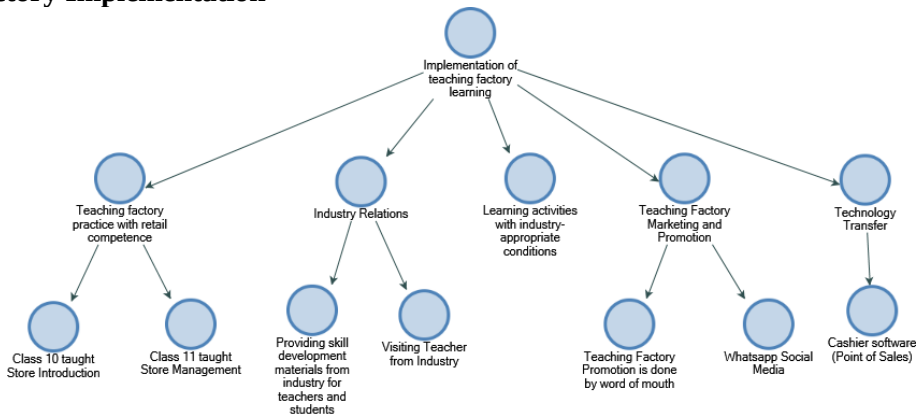

Figure 2. The Implementation of Teaching Factory Learning

One of the success measurements of educational activities in vocational schools is the number of vocational graduates who are getting job in the working world or as entrepreneurs (Prianto et al., 2020). In detail, it is explained that the objective of Vocational High School is to produce graduates who are in line toward the industrial sectors based on their field of expertise. Vocational High Schools are expected to be able to complete their students to have the skills needed by the industrial sector and provide knowledge related to the entrepreneurship. One of the debriefings carried out by Vocational Schools is to carry out teaching factory learning where this learning is a trademark of Vocational Schools.

The teaching factory is conceptualized similar to the working environment for students. SMK N 6 Surakarta carried out teaching factory learning by establishing a retail store-based teaching factory as it is called by "viskamart". The establishment of this teaching factory is based on the competence of graduates of SMK N 6 Surakarta, the Online Business and Marketing program which graduate someone who works in the retail sector or in the business sector.

Students carry out business practices on a scheduled basis at the teaching factory under the direction of the store coordinator and practice according to basic competencies. Practical material comes from industry partners and comes from schools. Every day there are 4 students who practice with their respective tasks. Every day, students perform their duties as cashiers, perform administrative transactions, display goods, serve customers, perform warehouse administration and perform daily financial administration.

In the teaching factory development guidebook issued by the Ministry of Education and Culture to see how well the teaching factory can be carried out with several parameters as follow:

1. Management parameters
2. Laboratory parameters
3. Parameters of training learning strategy
4. Promotion marketing parameters
5. Product-service parameters
6. Human Resources Parameters
7. Industrial cooperation parameters

Viewed from these parameters, the teaching factory at SMK N 6 Surakarta has fulfilled and covered all the parameters. However, the marketing promotion parameters have not been carried out massively. Promotions are only carried out in the school environment and have not been able to cover a wider market share. The integration of technology into the teaching factory learning process is still low. All processes still rely on traditional retail and have not been able to implement it towards the internet of things.

The implementation of teaching factory learning produces competencies that are in line to the learning outcomes of students, covering:

1. Stock taking competence
2. Goods storing competence
3. Product display competence
4. Transaction administration competence
5. Cashier Competence
6. Excellent service

All competencies produced are business and marketing competencies will be useful for students to work in their future.

Challenges toward the Implementation of Teaching Factory Learning

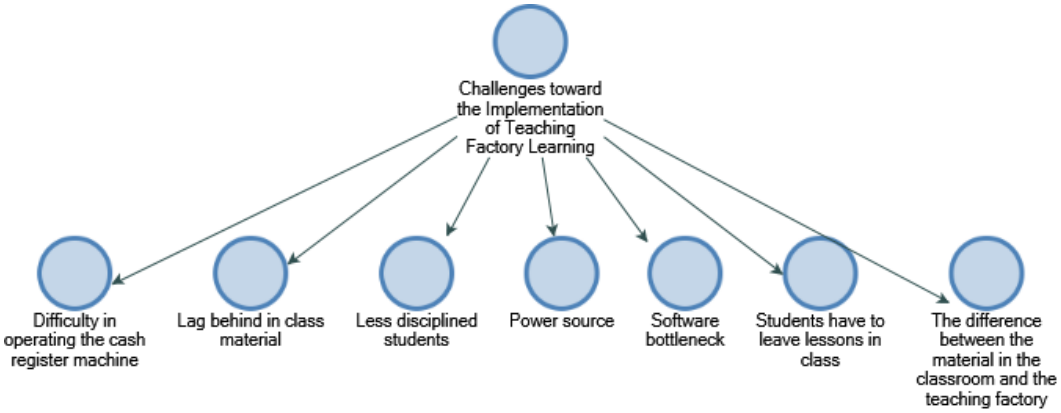

Figure 3. Project map of Challenges toward the implementation of teaching factory

Teaching factory is a complex learning that involves many parties. All components must be able to support each other. Previous research has revealed many obstacles that can occur in the implementation of teaching factory learning, including research conducted by (Widiyanti et al., 2019) which shows that the obstacles in teaching factory learning are from aspects of learning, human resources, facilities, and cooperation with companies. Meanwhile, research conducted by (Sari & Silviana, 2020) shows that the human resource factor is the main factor that becomes an obstacle in teaching factory learning. The human resources in are the teachers and the students. In contrast to the two researches above, (Sulistyo et al., 2019) found that the obstacle to teaching factory learning was the lack of cooperative attitudes of students in practicing.

Based on the findings of the research, it can be concluded that evidence of obstacles in the implementation of teaching factory learning, covering the differences in the material taught in class to what was learnt in the teaching factory, obstacles that occur in supporting facilities, time management, and lack of cooperative attitude from students. The difference in material affects the process of implementing the practice in the teaching factory. Students are more difficult to carry out the practice because they are still unfamiliar with the material being taught. Students still feel unfamiliar with the practice because it has never been taught in class.

Another obstacle is the cashier software which makes the transaction process experience problems. If the software used is not repaired immediately, errors in the software will always accumulate and make it permanently damaged. In addition, permanent damaged, the error in the cashier software also has an affected to the transactions that are hampered and must be entered manually using a book. Problems to this software include obstacles to aspects of teaching facilitation support facilities as expressed by (Widiyanti et al., 2019).

The next obstacle is the internal obstacle in the form of time management from schools and students. Students who are in the teaching factory must leave the class and not joining the learning process. Missing material in the class must be pursued by students in the future when they are no longer practicing in the teaching factory and this is the complaint of students.

Another obstacle that becomes a problem to the implementation of teaching factory learning is the student's factor. Students lack a cooperative attitude in learning, causing them to lack discipline in carrying out teaching factory learning. These obstacles were also found in previous researches by (Sari & Silviana, 2020) and (Sulistyo et al., 2019) which made the *teaching factory* learning process not run smoothly.

Conclusion

Teaching factory learning is an industry-based learning that integrates schools with the industrial sector. The implementation of the teaching factory requires support from the industrial sector so there is a link and match between the industrial sector and schools and vice versa. The implementation of teaching factory learning at SMK N 6 Surakarta has fulfilled the parameter standards of the Ministry of Education and Culture and has produced competencies that are relevant to the learning outcomes of the expertise program and useful for students to work. However, the promotion and marketing parameters still need improvement because promotions are only focusing on verbal promotion and targeting only the school environment and around schools. The use of online marketing technology is still very low. It is important to integrate technology into the teaching factory so the teaching factory will step forward in the industrial era.

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