

**MANAGEMENT MODEL DEVELOPMENT OF TEACHING FACTORY
“PROCOM CAKEP” IN THE FIELD OF ENGINEERING TECHNOLOGY****M. Burhan R Wijaya** ✉ **Ari Tri Soegito, Maman Rachman, Willem Mantja**

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*Keywords:**Teaching Factory (TEFA),
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(PBT), and Competency-
based Training (CBT)***Abstract**

The management model development of Teaching Factory *Procom Cakep* (Production competency of a professional would-be employer) in Engineering and Technology field is a management concept which combines *Production-based Training* (PBT) learning and Competency-based Training (CBT) in the real situation, so that at minimum, the process of achieving graduates' competency can meet the industrial world working standards. Finding and developing TEFA *Procom Cakep* management model in Engineering and Technology have been done through model validation with Research and Development approach. Teaching factory *Procom Cakep* management model orientates on business concept and production in vocational education in line with relevant skills and competences. In order to achieve the research purpose, Research and Development approach, preliminary studies, model design development, experiment, and validation have been carried out. Preliminary phase was planned to have these following steps; literary study, field study, factual field description and analysis. After this step, the model group is guided by current group to develop and implement TEFA *Procom Cakep* management model in Engineering and Technology. The data analysis in this research includes preliminary study, finding facts about the applied productive learning program which is reported in a data collection, and then interpreted qualitatively. The analysis of design Process and development is carried out in peer-group and expert judgment. The result of the experiment and induction is delivered in data and the applicability is analyzed in descriptive qualitative. The developed Teaching Factory management model can be applied in the executors of *Procom Cakep* management model in Engineering and Technology (Principal, teachers, public relation and industry partner).

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INTRODUCTION

The Transfer of technology and skill process from business world and medium and large scale industry in the real industry life shows that the students get quite low skills experience (Sutopo, 1998). A simple touch to small and medium industry has a big potency to create entrepreneur attitude effectively and not secluded from the progress of industry in the world (Samsudi and Sudana, 2001), and the education ability to inform new technology is almost never ahead of industry and business world.

A good school unit management can give the students skills and entrepreneur attitude. This creates a paradigm that the management of school unit production is supported by cooperation between vocational school and industry and business world.

The matter of management, the stock of teaching kits, facilities, experienced productive teacher, and the students in Teaching factory *Procom Cakep* as a school unit production management development which includes the students in the business so that this case can grow entrepreneurship for both teachers and students.

The school production unit development through *TEFA Procom Cakep* has these following targets; (1) to have an effective and well-planned production unit management, (2) to do production marketing activity, (3) To include both students and teachers in the production process, (4) To join all subjects to school production unit, (5) to have an appropriateness between school product and skill subjects, (6) can fulfill local and national markets, (7) to improve market value and production unit income, (8) to improve the quality of the product that can meet the need of the market, (9) to improve the function of production unit in industrial working because production unit as a model of industry and business world, where teachers and students can improve their ability and prosperity. This result will give positive effect to the teaching and

learning process so that producing high quality graduates as the market needs.

TEFA Procom Cakep approaching program is a blending between PBT (*Production-based Training*) which is based on real job and CBT (Competency-based Training) which the training is held at the place where the students work.

The development of *TEFA Procom Cakep* tends to management process in the class room and practice based on procedures and industry operational standard with these following steps; (1) Planning based on preparation of needed actions. This is done by looking at the strength and weaknesses of the organization, deciding the threat and opportunity, strategy, policy, and programs based on decision making with the anticipation to minimize the discrepancy in achieving the goal effectively and efficiently, (2) Organization is a process to divide jobs as the ability to empower resources and arrange it. There are two things that must be done; fixing the organization structure, job division, authority, responsibility to take care of *TEFA Procom Cakep*, (3) in practical level, *TEFA Procom Cakep* program receives orders and produces commodity according to the standard has been determined by the consultant. The students are responsible for the administration, production, maintenance, and quality control according to the standard has been determined by the consultant. Concept orders were administrated and sent to Planning department to count the price. The result is sent to production department. This department arranges the jobs according to the numbers of workers and time limitation. Administration writes the number of products according to the standards have been decided by the consultant before going to the marketing process. If it's an order products, marketing department ensure the quality and number of the products to the customers and they make the report of it. If the products aren't order, so the marketing department sells the products to the customers. All sold products must be reported to administration after decreased by electricity and material cost. If the materials and other equipments are from the students, the income

from selling just decreased by electricity cost only. (4) Evaluation and monitoring are done by the consultant who is also the assessor of the production unit. This phase means that the unit leader is an assessor for his subordinates and production unit is the assessor of each unit leader.

The consultant or assessor gives his evaluation to the manager and other department. The evaluation from the assessor is based on the criteria have been decided before. Assessor's final mark is a mark from unit leader, production unit leader, and manager. The mark given to the students is a mark after they finish doing their job according to competency standard and skills. The assessment sheet is brought by the students to give to the assessor anytime assessment is done. From that case, the development of TEFA *Procom Cakep* in Engineering and Technology must be carried out to increase the quality of vocational school (SMK) graduates.

Research and Development approach is carried out in order to achieve the research purposes above, through a preliminary study, model design development, experiment, and validation. Preliminary study includes these following phases; literary study, data gathering, factual finding description and analysis which includes; description of TEFA management in vocational school, (2) description of TEFA developer group who implements this model, (3) Arranging TEFA *Procom Cakep* model, (4) Design experiment and effectiveness through FGD to develop and implement TEFA *Procom Cakep* effectively and efficiently.

REVIEWING REALATED LITERATURE

Good education needs strong support of infrastructure. This may be an obstacle in all vocational schools, both public and private school. Actually, every vocational school has

human resources (teachers/ instructor), equipment and facility which need to be empowered, so that the obstacle is no longer exist. However, not standard equipment must be considered.

Training activity held by vocational school sends the students to some industrial areas can't meet the criteria of practical level to increase graduates quality both qualitative and quantitative. Some common reasons like (1) the lack of industry and business to absorb the students, (2) limited found, (3) Doesn't have a training center, (4) doesn't have an experienced instructor, (5) prejudice trainees will interrupt the production activity, (6) lack of partnership.

A high quality education needs education management which mobilize all resources. Many attempts have been done to improve the school quality so that it can meet the need of industry. Even though the curriculum have been made according to the industry need, this is not enough to create better graduates.

The reality shows that vocational school graduates don't match to market demand (Soenarto 2003:16). Huge industries have low attention to the quality of graduates because they feel burdened by the trainees in their company (Joko 1996:104). The effort to improve the vocational school competitiveness is done by the strategy of quality and relevancy development by guiding some vocational schools whose graduates have national characters to improve local strength, and compete in global market and also have international competitiveness. (Renstra Depdiknas 2005: 67-69).

Besides, vocational school quality betterment must be carried out to improve skills competences (standard practices, preventive maintenance, troubleshooting inspection, and modification), knowledge and attitude as a would-be employer.

Table 1. SMK's gaps with the Industrial world (June 21, 2008)

| SCHOOL | INDUSTRIAL WORLD |
|---|---|
| The work as simulation (practice). | Doing the work as order. |
| The quality of the work is measured by scale of 0 - 10. | The quality of work is measured by "accepted - Rejected" |
| The risk of work is still tolerable. | It has a fatal risk, failure and harmful |
| The time tolerance is rather loose. | The utilization time is tight. |
| The failures are not considered. | The delay is considered as loss. |
| The students' morale depends on motivation. | The work situation and condition boost the productivity |
| It's difficult to form a work ethic. | It's conducive to form a work ethic. |
| It's slower in following the development of science and technology. | It's slower in following the development of science and technology. |

([http://yudipurnawan.wordpress.com/2008/06/21/kesenjangan-smk-dengan-dunia-industri/http://news.letter.politeknikaceh.ac.id/?p=40.](http://yudipurnawan.wordpress.com/2008/06/21/kesenjangan-smk-dengan-dunia-industri/http://news.letter.politeknikaceh.ac.id/?p=40))

The graduate's gaps with the needs and the employment growth happen because the policy in vocational education doesn't have strong direction to integrate education and training towards continuing education. There are a lot of vocational education institutions which oriented on teaching and assessment to achieve the curriculum, not toward the competence proficiency demanded employment. Besides that, the vocational education budget is still low, so that vocational teacher is being a second choice and lack of job opportunities for students in industrial practices.

The Department of National Education (Depdiknas) has a program of empowerment SMK by increasing the number of SMK, improving the quality of SMK, building the image of SMK in the society. As we know that Depdiknas program in 2015, the comparison between SMA and SMK is 70 : 30 for the number of schools and the number of students with the total SMK/SMA students in Central Java 1,107 : 864 or 52.87 : 47.32 percent, and the ratio of the number of SMK : SMA 420,192 : 371,326 or 52.7 : 47.3 percent. From 1,107, only 5% of SMK has SMM ISO certification nationally. It means that there are only 221 SMK and 72 are in Central Java and only 39 outstanding SMK which has complete HRD facilities with the site of competency test (TUK). Therefore, the Provincial Education Department

of Central Java continues to encourage the improvement of service quality in SMK.

Industry-based SMK which is dependent on the existence of industry would worsen when increasing the number of vocational students happens. Therefore, in order to make the existence of SMK better, it should build own industry in the community around the school as graduate employment base. The more established industries will further strengthen the existence of SMK although through medium industries. School-owned industries can be established on the basis of residence where students come, or in every village or at least in every sub-district closest to the school environment. It is to gain moral support from the local society as well as capital. Then, the involvement of all components of the school (teachers, students, and the society) is needed to be grown. As a real description, the teachers who lived near from the location are involved in the management and procurement of raw materials, the local society (students'parents) are involved in the provision of places, the schools involved in the provision of equipment and students are involved in production process. If this process goes well, then there will be a lot of benefits that can be obtained: 1) it can accommodate labor of graduate of that school, 2) it can be used as students industrial work practice so that schedule setting of industrial practice is more

flexible because it is not dependent on other industry, 3) it can help to grow the economy of the society around the school, region, and nation, 4) it can increase the level of welfare of the school community, 5) it can build a society of entrepreneurial spirit, and 6) it can promote cooperation between schools and society. The program of increase the number of SMK in term of expanding access, improving quality and public image can be realized well, if the learning in SMK can conduct a business appropriate with reality (not a simulation only) through good TEFA management.

RESEARCH METHOD

This study used research and development approach. This procedural model adapted research and development model of Borg and Gall (1983:775-6). This study was implemented to produce a development model of TEFA. The first step was describing the management of TEFA in SMK and determining a potential developer group of SMK to participate in the concept of arrangement on management model of TEFA SMK. Based on the description of the findings, the next step was developing a tentative model of TEFA management and implementing the management model of TEFA in SMK. This research was carried out in several vocational schools in Semarang city. The subjects were a group of TEFA developers (principals, teachers, stakeholders) with a purposive manner. The data collection in this study were grouped into two stages: the first was a preliminary study and development. The second was the testing phase and the influences. In preliminary study and development, this research used technique of questionnaire, observation and documentation, and also the study of literature. In the testing phase and the influences, it used observation and questionnaire as the basic data collection.

The data analysis is a descriptive data (mean, median, mode) which is then interpreted qualitatively. The process and result of the design development is conducted in a peer-group analysis and expert judgment. The test result and the influences analysis is descriptive results in the

form of data presentation. Similarly, the level of applicability was analyzed by descriptive qualitative manner.

DISCUSSION

One of the programs initiated by the government through the Department of Education is organizing Teaching Factory program in Vocational Education. Teaching Factory is an industrial-based approach in the process of learning in vocational schools. It means that that the school will do the planning, execution, and product control in accordance with the real standard of industry.

From the explanation above, it can concluded that TEFA management is a management system of industrial-based teaching which implemented in schools professionally with planning, organizing, preparation of personnel, guidance, and good supervision to produce a product in accordance with the industrial standards. There are some important reasons why the learning in school using Teaching Factory is necessary. They are (1) it can improve the competence of teachers and students, (2) it can encourage the creation of quality culture in schools, (3) it can create an industrial culture in school, (4) diversification of financial resources in school, (5) a place for students' and teachers' creativity and innovation, (6) a means to develop the entrepreneurship in schools, (7) an internship and shelter graduates who have not got a job yet in industry or business world.

The Central Java policy to encourage the development of Teaching Factory in vocational schools are part of an effort to improve the quality, competence, and readiness of students to enter the workforce. It can sustain a policy of the Governor of Central Java in making democracy-based development as priority. By the same token, the Central Java government through the Department of Education has provided financial assistance to the best vocational schools both public and private to develop the Teaching Factory according to their potential. However, Teaching Factory program

is expected not only developed in vocational schools receiving financial assistance from the Ministry of Education and Culture or the Central Java government, but also the whole SMK especially in Central Java as an effort to improve the quality of graduates. Institutionally, Teaching Factory or Teaching Industry can be implemented in the form of production unit or other forms that do not conflict with the applicable rules and regulations, and integrated in learning activities or outside of learning.

Organizing and mechanism in each school might be different. It happens because the character of the product as well as the situation and environmental conditions are different. Therefore, it necessary to arrange a guidebook of Teaching Factory implementation so that the implementation is in line with expectations.

Teaching Factory *Procom Cakep* program which were implemented by SMK must be accordance with the vocational skills program. Among of them are: (1) SMK Negeri 7 Semarang has been implementing Teaching Factory assembly computer area with the brand of SMK-Zyrek in cooperation between the Director of Vocational Education Development - General Directorate of Primary and Secondary Education Management – National Education Department and the Director of PT. Zyrexindo Mandiri Buana No. 0769/C5.4/ Kep/KP/2008. The cooperation between SMK Negeri 7 Semarang and PT. Zyrek aimed to develop teaching factory in the field of computer assembly factory in SMK to meet the shortage of laboratory equipment in vocational practice, especially for computer subject through National Budget (APBN) 2009, and the procurement of laptop/ SMK - Relion net-book for teaching and learning activities through the assembly at SMK in 2010 based on the allocation of APBN the Directorate of Vocational Work Unit, General Directorate of Primary and Secondary Education Management No. 2724/C5.4/Kep/KU/2010 dated October 13, 2010. The Implementation of aid programs through teaching factory computer assembly is expected to be able to increase the competence of the learners. (2) SMK Negeri 1 Semarang

with Teaching Factory program on motorcycle assembly in cooperation with PT. Kanzen motor Jakarta in 2010 and being assembled at SMK Negeri 1 Semarang. In 2011, this school is believed to assemble “Turangga” car, and (3) SMK Negeri 4 Semarang by developing Teaching Factory on manufacturing appropriate technology designed and manufactured by machining expertise, automotive services, Audio, and LCD.

In order to make the Factory Teaching program run well, focus, measurable, and accountable, it's required a standard guideline management scheme in the implementation of Teaching Factory in vocational schools so that the schools will have a standard scheme in the process of developing , organizing, mechanism and rules, reporting, monitoring and evaluating for accountability and responsibility. Vocational School with professional Teaching Factory has development opportunities, which participate in helping to reduce poverty, especially if supported by creative businessmen and have a resistance to the change. Therefore, SMK through TEFA need to make efforts which are able to develop the culture of creating opportunities and take advantage of the situation more creatively. This method is adopted to encourage the students to utilize their knowledge and skills to develop the business, so that the students can work, continue their study or become an entrepreneur.

The implementation guidelines of Factory Teaching in SMK in Central Java particularly need a standard scheme in the process of developing, organizing and reporting mechanism, monitoring and evaluating in the context of accountability and responsibility, so that the activities of Teaching Factory in SMK can give a real contribution to the advancement of SMK, then it can encourage the success of Central Java as vocational province.

Management and development guidelines of Factory Teaching in SMK can provide direction, a real contribution in achieving the educational goals, particularly vocational education. Besides that, it's also expected to be a guide of stakeholders in fostering, monitoring

and evaluating the schools in the implementation of Teaching Factory program especially Teaching Factory development activities at schools.

The objectives and benefits of Teaching Factory are to encourage SMK to do some innovation and technologies that have benefits for the society and the world of industry, build and develop self-reliance of SMK through empowerment the potential, develop the potential of entrepreneurship of SMK and give training for students to be candidates for potential young entrepreneurs, increase the current curriculum which will focus on the concept of modern manufacturing, the facilities of productive practice directly for students, the place of production-based training for students, provide an opportunity for students and teachers to do the market-oriented practice jobs, help the funding for maintenance, additional facilities and other education operational costs, build the school's capacity in synergistic cooperation with external parties, environment and community, and develop a culture of industry in schools.

The TEFA management refers to the principle that the implementation of TEFA must be in line with the goal of independence, accountability, responsibility, transparency, partnership, effectiveness, and efficiency. Independence means that being independent in self-regulating (not dependent on others). Accountability means that the written accountability of PJP on Teaching Factory submitted to the principal. The principle of accountability in the management of TEFA can reduce and even avoid suspicion of irregularities that have occurred and misguided policy. Responsibility is the responsibility of feasibility of work. Transparent management of TEFA SMK can reduce a mutual suspicion among the school community and mutually beneficial partnership in equal relation and interactive, active, and positive. Effectiveness is any effort to achieve results / output in accordance what we want. Efficient is a process that produces something that required the sacrifice of the most minimal resources, especially the cost, time, and energy.

TEFA leadership pattern uses intrapreneurship leadership rather than entrepreneurship because intrapreneurship is entrepreneurship within the organization (Hisrich & Peters, 2002). The characteristics of intrapreneurship leadership (Hisrich & Peters, 2002) are: (1) understanding the environment, (2) flexible, (3) encouraging the open discussion, (4) building support, and (5) tenacious. Fostering employee/ labor must be done intensively and wisely in order to make conducive situation in working.

Teaching Factory management put together a program of academic supervision objectively, responsible and sustainable (student's participation in the production and curriculum). The principal supervise the implementation of academic supervision program. As for the technical implementation, it can involve the vice principal of curriculum, the chief of study program/ expertise competence, or other relevant unit.

Teaching Factory management should be able to keep an eye on expenses to keep production costs as low as possible and sell the product with ompetitive price. The management also be able to guarantee that suppliers send the raw materials costs and a reasonable quality as agreed, and store them properly to prevent damage. Then check the raw materials sent by suppliers to ensure that they are in good quality and price which have been agreed (Dikmenjur, 2007).

In business, it is required to maintain the stock of raw materials, semi-finished and finished goods to meet production and sales target. Management and quantity control means that you have to keep the stocks as needed. Ensure the products/ services in accordance with the quality standard by adequate testing and criteria. Use the form of finished goods control result as feedback to maintain standard production process.

Teaching Factory management needs to make sure that every worker of the production has got a complete instruction, easy to understand, clear and simple about the production process. The management gives

them a clear description and diagram. Any changes to the policies and procedures are clearly given to them to ensure the quality, cost, and production time (Dikmenjur, 2007). To prevent the finished products become defects, it is needed to do routine check procedure in the process, proper planning, good engine maintenance and motivation for production/ service workers.

Teaching Factory management must be able to oversee the production and delivery time of goods to customers. If the Teaching Factory is unable to keep its promise to the customer, time by time, Teaching Factory will lose customers and buyers and it will be eventually bankrupt.

Before starting production, it's better to think first about "who is going to buy the product or service?", or in the term of business, it can be said "who is our market target". Market is a place for consumers who will buy some products/ services produced by a company. The market target of bookstores are students/ student college. And record companies are those who love music, and so on.

Marketing is an activity undertaken to sell the product as the market expected. Activities in marketing include product planning, price determining, distribution and promotion. These are well-known by the acronym 4P: Product, Price, Place and Promotion.

System and Reporting Mechanism is divided into two kinds, namely internal and external reporting. Internal reporting is conducted for a good organization and businesses. Monitoring can be handled by the commissioner. Internal reporting mechanism is used for all providers in Teaching Factory either with facilities given by the Provincial Education Department or not yet. And external reporting is for accountability to the aid provider (the Provincial Education Department) on development of Teaching Factory.

The TEFA monitoring and evaluation is a monitoring service to TEFA management in order to do the duties and functions better and in good quality. The basic function of monitoring and evaluation (M & E) is effort to improve or fix the clinical TEFA performance internally and

external function in the context of performance assessment on accountability in TEFA aid management. M & E are programmed, planned, and continued activities. Therefore, M&E activities of TEFA must be implemented, developed, and evaluated.

CONCLUSIONS

1. TEFA management model in SMK is appropriate with the needs of business and industry formulated and tested together with the model group (teachers, SMK management, and stakeholders/ industrial world).

2. Document of Guidelines of TEFA Management in SMK is appropriate with the needs of business and industry formulated and tested together with the model group (teachers, SMK management, and stakeholders/ industrial world) and feedback group. TEFA can be effectively and efficiently implemented.

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