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Developing Student Entrepreneurship Through Teaching Factory Program in the Field of Motorcycle Service

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Abstract

Teaching Factory program in the field of motorcycle service which is developed in SMK Bina Utama Kendal is quite well. However, it does not train students to gain practical experience in applying entrepreneurship. Students have not been involved in the planning, organizing, monitoring, and evaluating stages in the teaching factory program. This research aims to develop the management model of teaching factory programs that increasing student entrepreneurship in the field of motorcycle engineering and business competence. This research use R&D methodology. The research procedure consists of (1) Introduction, (2) Developing Model, (3) Testing Model. The result of the study shows the management's last model in teaching factory program is valid, effective, and easy to use. It can be used to develop student entrepreneurship based on significant results between pretest and post-test. The model which is developed in this research use entrepreneur real concept by asking students directly and giving responsibility to start from planning, organizing, conducting, evaluating in teaching factory management. This model develops students entrepreneurship such as discipline, hard work, creativity, a sense of collaboration, honest, and goal-oriented. Furthermore, it increases student's knowledge and ability in the field of motorcycle engineering.

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INTRODUCTION

Vocational high school (SMK) is the school that is focused on developing student's talents and skills in the current field. It is written on National Education System Law, number 20 of 2003 article 3 about national education goals, and the explanation article 15 said that vocational education is secondary education that prepares students primarily to work in certain fields.

Vocational high school are expected to decrease unemployment number, giving contribution in creating human source to fulfil global needs. According to Indonesia Statistical Data Center (BPS) on August 2019, Vocational School contribute the highest percentage of unemployment in comparing with other education level, it achieves 10,42%. This unemployment percentage is lower than August 2018 which is 11,24%. The high unemployment rate is caused by frequent mismatch between the theories obtained in the school and in the real life, even the results learned in schools both theories and practices differ from conditions in the work field.

One effort that can be done to solve the problem is learning the developing model of teaching factory. The teaching factory is a learning concept based on products/ services that focused on the standard and procedure which is used in the industry. This learning concept is conducted with the industrial atmosphere so that it can be a tool to connect the competency gap between industry and vocational student graduates.

SMK Bina Utama Kendal in 2018 was designated as a recipient school for teaching factory development assistance by the Directorate of SMK Development, Ministry of Education and Culture of the Republic of Indonesia as written in the Decree of the Director of SMK Development Number: 6965 / D5.3 / KP / 2018 dated September 3, 2018. Furthermore, followed up by a document of the cooperation agreement between the Directorate of Vocational High School Curriculum Subdivision with the principal of SMK Bina Utama Kendal Number 8149 / D5.3 / KU / 2018. Teaching factory program in SMK Bina Utama Kendal for the first stage is applied to the Motorcycle Engineering and Business (TBSM) competency in the form of a motorcycle service workshop.

The observation result of a teaching factory program in SMK Bina Utama Kendal at Motorcycle Engineering and Business is quite well. However, students have not been trained to improve their entrepreneurial skills. The students have not included in the stage of planning, organizing, monitoring, and evaluating. They only included in conducting the practicum in the workshop as noted in the schedule. The teachers use the TF 6 M model of teaching factory in teaching and learning activities, these are the steps: accepting order, analyzing order, declaring order, executing the order, doing quality control and giving back order to the customer. The students' activities in the workshop are executing an order that is appropriated with competency-based training. Commonly, the teachers give the students work to achieve competency-based training, furthermore, the staff/engineer of the teaching factory will finish it. This condition makes students do not get a lot of experience to maintain a business of motorcycle workshop if the students want to build their work sooner after graduating from the vocational school. The students have not had entrepreneurship value yet to enter the real work atmosphere. On the other hand, entrepreneurship subjects in the teaching-learning process focus on theory and exercise in the class. Some of the entrepreneurship activities have done outside of the classroom through the applied activities are not match the students' core competency. It brings students interest to tend to low to build up their entrepreneur sense.

The teaching factory integrates the learning process to produce a product or merit that can be sold to get adding value for school (Directorate of SMK, 2008). It means that the teaching factory process can improve students' entrepreneurship skills. Through a teaching factory, the vocational school can produce a product or merit that has an adding value and can be accepted by the environment.

According to Chryssoloris, G. (2016) teaching factories facilitates the real environment to the students for upgrading their skills and understanding the industrial challenges. According to Rentoz, L. (2014) from the academic side, the learning model of the teaching factory will give a new experience to

the students. Giving a new type of learning that is not available in the textbook or laboratory. The learning model of teaching factories gives students' opportunity to dig up certain knowledge and apply it and work in line with industrial standards. Finally, their work can give influence for the environment.

Based on Afonso, P. (2008) explanation in the paradigm of teaching factory can be used to make a positive synergy between school and industry, creating good communication, a place to share knowledge and experience. Furthermore, it improves creativity and problem-solving ability to produce a new solution.

According to Müller-Frommeyer (2017), the concept of teaching factories can improve competencies/methodologies as well as social and personal. The learning process in the teaching factory can be planed to focus on relevant competency.

The management of the teaching factory consists of planning activities that are needed to determine the goal or action plan to achieve a certain goal (Kuswantoro, 2014: 9). There is an influence between entrepreneurial knowledge and entrepreneurial interest, which means the higher entrepreneurial knowledge, the higher the effect on entrepreneurial interest.

Research is conducted by Purwidyantini (2017) has led to the conclusion that the implementation of the teaching factory can improve entrepreneurship education in Kendal 2 Vocational High School students.

Research that is done by Setyawan (2014) provides a conclusion that the 6-step teaching factory learning model can improve students' entrepreneurial attitudes of competence in motorcycle engineering expertise at SMK Negeri 1 Majalengka. Research is held by Siswanto (2011) has concluded that the implementation of Teaching Factory is quite effective in improving students' competence and entrepreneurial spirit.

Research is conducted by Nurtanto (2017) has concluded that the teaching factory is an industry-based learning system that utilizes production units as a place to run a business or production process. Teaching factory management includes planning, organizing, implementing, and evaluating. A teaching factory that is developed is integrated with the production unit to conduct student practices.

According to Wijaya (2014), the Tefa management model (Teaching Factory) which developed includes aspects (1) planning, namely by analyzing strengths, weaknesses, opportunities, and policy threats. (2) Organizing: the arrangement and empowerment of human resources by arranging organizational structure, division of labor, authority, responsibility for implementing Tefa. (3) Implementation: receive orders and produce the products in the form of goods/services by predetermined standards. Students are given responsibility for administration, production, maintenance, and quality control standards that is set by consultants, training entrepreneurship, and business service management. (4) Monitoring and Evaluation activities are carried out by the production unit and other unit leaders by the organizational structure.

The purpose of the study is to develop the management model of teaching factory that is valid, easy to use, and effective to raise vocational students' entrepreneurship in Motorcycle Engineering and Business competency.

RESEARCH METHOD

This research is included in development research. There are four steps in conducting the research: (1) Introduction, this stage explains how the researcher collecting data based on the research problem, literature study to build the product design; (2) Developing Design, the researcher designs the management of teaching factory model to raise vocational students' entrepreneurship; (3) Expertise Judgment, this stage measures the validity of purpose model, and it is continued by revision; (4) Testing (Sukmadinata, 2015: 184).

The data source of this research consists of three stages, namely data source to define a factual and conceptual model, model validity, and model testing. The data source in the defining stage factual

and conceptual models come from direct observation and teaching factory theoretical review. The empirical subject comes from teaching factory program observation in SMK Bina Utama Kendal. The data source or research subject in the model validity stage is lecturer judgment who expert in vocational education and teacher who expert in Motorcycle Engineering and Business competency. The data source is 32 students of XII grade students of Motorcycle Engineering and Business competency of SMK Bina Utama Kendal. The data collecting technique in this research is observation method, interview, questioner, documentation and attitude aspect test, knowledge, and students' skills. The data validity is the researcher's effort to find his finding that can be trusted or can be considered (Moleong, 2008:321).

The validity test from this instrument is content validity. The instrument validity tool uses the correlation formula of product-moment (Arikunto, 2018: 85). the reliable calculation using the Alpha coefficient formula (Supranata, 2004: 114). This Difficulty Index indicates the difficulty level of the question (Suharsimi Arikunto, 2002:100). Model validity is done by education expert that have criteria in examining the model. In this research, there are two examiner experts in the field of vocational education. The practicality analysis is carried out after a limited scale trial done. The analysis used descriptive analysis to know the practicality of teaching factories model by using questioner. The analysis techniques use a limited scale trial that is used in the teaching factory of SMK Bina Utama Kendal to measure the model effectiveness by using the Paired Sample T-Test SPSS 16 program.

RESEARCH FINDING AND DISCUSSION

The final results of managing the teaching factory program are described as follows:

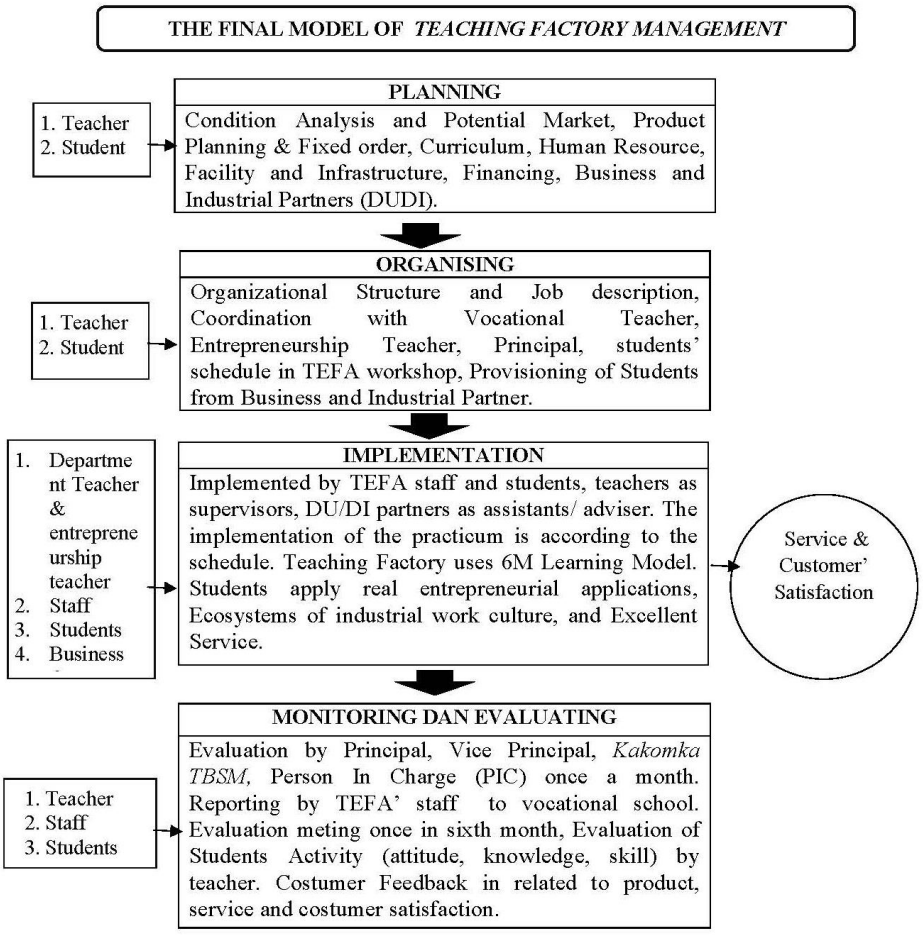


Figure 1. The Final Model of Teaching Factory Management

The development result of the final model is achieved after the hypothesis model is tested with a limited scale. The designing stage consists of (1) condition analysis and potential market; (2) product planning and the fixed order; (3) curriculum included syllabus, lesson plan, schedule and job sheet; (4) human resource as the person in charge; (5) facilities and infrastructures need; (6) financing; (7) business and an industrial partner.

The organizing aspect consists of (1) the existing of organization structure and job description in every position; (2) communication and coordination among vocational teacher and entrepreneurship teacher; (3) rule-schedule for teacher, students in TEFA; (4) students assistance activity with business and an industrial partner (DUDI)

Implementation aspect consists of (1) teaching factor is held by expert staff and students, vocational teacher as the adviser, the industrial partner (DUDI) as activity and marketing guidance; (2) the implementation of TEFA schedule based on students' practicum schedule, teaching factory uses 6M learning model; (3) students applied entrepreneurship real application (planning-processing-handling product/service) and ecosystems of industrial work culture; (4) marketing strategy - promoting - seeking order and (5) excellent service.

The monitoring and evaluating aspect consists of (1) monitoring by the principal, vice-principal, Kakomka TBSM, and related person in charge to have a meeting once a month; (2) reporting by expert staff to the school/institution; (3) evaluation meeting related to TEFA implementation once in the sixth month; (4) students evaluation (attitude-knowledge-skill); (5) customer feedback related to product, service and customer satisfaction

The Validity of Teaching Factory Management Model

The results of the expert validation state that the design of the teaching factory program management model is valid and feasible to apply. The first examiner gave a total score of 48 with an average of 3.20, it is including a "valid" category for the design of the developed model. The second examiner gave a total score of 46 with an average of 3.07, it claims "valid" for the design of the developed model. The average evaluation result by the examiner is 3.13. It states "valid" since the assessment interval within the range of 2.51 - 3.25. Based on the submitted validation sheet, the expert examiner provides an assessment of the developed model. It concludes the development model is feasible to be applied with a slight improvement".

The Practicality of Teaching Factory Management Model

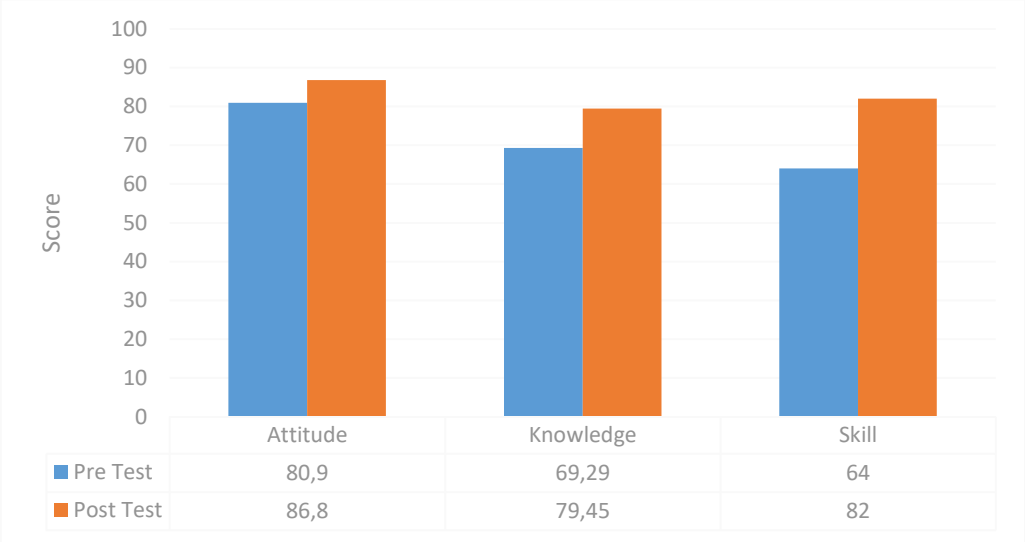
The practicality of the Teaching Factory Management model is obtained through the students' questionnaire responses. The feasibility analysis is conducted by constructed instruments based on a Likert scale (1 - 4 intervals). The results of student responses are analyzed by the total and, mean scores. The results of student responses achieve an average of 3.35 which means this model is "very practical". In other words, the management of the teaching factory model is declared very practical in its use.

The effectiveness of the Teaching Factory Management Model

The effectiveness analysis of the teaching factory management model is based on the results of pre-test and post-test assessments. This assessment consists of attitude aspects, knowledge and skills, and N-Gain calculations to measure how much the three aspects may increase in the research.

The application of the teaching factory model that has been developed in this research improves the average value of students' learning. In the attitude-aspect increases from 80.90 to 86.8 on the average results of the post-test. The aspect of knowledge has changed from the average pretest of 69.29 to 79.45 on the post-test. In the skill-aspect tend to increase from 64 to 82 on the average results of the post-test.

The pre-test and post-test scoring of attitude, knowledge, and skill aspects can be seen in the following figure:



Fugure 2. The average score between pre-test and post-test

The increasing score (N-gain) can be seen by the following formulas:

$$\text{N - Gain} = \frac{\text{Post-test score - Pre-test score}}{\text{Ideal score - pre-test score}}$$

Table 1. The N-Gain of attitude, knowledge, and skill aspects as follows:

Aspect	Gain-Tested	Gain-Index	Category
Attitude	0.31	> 0.3	Medium
Knowledge	0.33	> 0.3	Medium
Skill	0.50	> 0.3	Medium

The development of teaching factory management emphasizes developing students' entrepreneurial attitude that appropriates with entrepreneurship climates by synchronizing entrepreneurship subject materials, motorcycle workshop management, and motorcycle engineering maintenance subject in the teaching factory model. In line with Saroni (2012: 47) explanations that in education, entrepreneurship is students' characteristically program that can produce a product or merit so that it can be used directly for the society.

The development of teaching factory management model can develop students' entrepreneurship. This result is in line with Setyawan (2004), it shows that the teaching factory uses 6 stages as follows: accepting the order, analyzing the order, declaring the order, conducting the order, doing quality control, returning the order. It can improve students' entrepreneurship attitude in the motorcycle engineering competency of SMK Negeri 1 Majalengka.

The entrepreneurial attitude that is developed in this research consists of discipline, hard work, creativity, teamwork, honesty, and target-oriented. It is the same with Isniani's opinion (2012: 21) that entrepreneurship subject produces entrepreneurship behavior and leadership, that have had a correlation in managing a business. The mentality that has to have an entrepreneur is confident, creative, innovative, brave to take a risk, has a vision, skillful, and has inner-power such as discipline, honesty, never give up, strong and active.

The implementation of the teaching factory model incriminates teachers of entrepreneurship subject to synchronizes based-competency of motorcycle engineering maintenance, creative product and entrepreneurship, and motorcycle workshop management subjects. This activity aims to provide entrepreneurship knowledge to the students. This result is similar to Jailani's research (2017) the influence of entrepreneurship knowledge can determine entrepreneurship interest, the higher of the knowledge may attract the higher of entrepreneurship interest.

The condition' analyze and potential have to conduct before the planning stage, the researcher classifies the environment condition into internal and external condition. Strength, opportunity, weakness, and threat may appear in the school to determine the priority choices. Internal aspects of the analysis condition consist of curriculum, human resource, facility and infrastructure, finance. While the external aspect consists of territory potential, business, and an industrial partner (DUDI). This research result is similar with Wijaya (2004), the development of teaching factory management *"Procom Cakep"* in the planning stage consists of some analyses such as strength, weakness, opportunity, threats, and program based on decision making to achieve an effective and an efficient goal.

In the organizing stage, some activities are conducted such as constructing organization structure and distributing job description, managing students' time schedules in TEFA, provisioning activity from business, and an industrial partner. This result is similar to Wijaya (2004) who shows the development of teaching factory management "*Procom Cakep"* in the stage of organizing by managing and optimizing human resources to construct the organization structural, job description, authority, and responsibility.

In the implemented stage, the expert staff and students conduct the program. The vocational and entrepreneurship teachers as a supervisor while business and industrial partners as activity and marketing adviser. The teaching factory is held in the practicum schedule. This model not only focuses on achieving competency but also persuades students to apply entrepreneurship in the real-life. (planning, processing, handling a product/merit) and marketing strategy- promoting product/ merit. Students carried out seeking the order, accepting the order, and producing a product/ merit as decided standard. Students are responsible for the administration, production, maintenance, and quality control as the business and industrial standard. This result is in line with Kuat (2017), teaching factory by using TF 6 M model which consists of accepting the order, analyzing the order, declaring the order, handling the order, doing quality control and returning the order to the customer can improve students' entrepreneurship significantly, such as students become more confident, goal-oriented, brave in taking a risk, and good leadership.

Some of the leaders take part in the monitoring stage such as principal, vice-principal, the chief of motorcycle engineering and business competency. This monitoring is done to record the development of ongoing teaching factory program. Monitoring activity is conducted once a month. The result of data from monitoring activities is reported to the institution. The problems are found in the monitoring activities will be discussed and will be solved in the meeting forum. The evaluation stage is reporting activity which is conducted by expert staff/staff, evaluation meeting, students' attitude assessment, knowledge, and skill, also customer feedback. Through the evaluation process, the institution determines the strength and the weakness elements that may obstruct the implementation of the teaching factory to maintain the quality, this is in line with Vocational Education Directorate (2017).

The validity of the model in this study can be seen from the results of the assessment of experts through the teaching factory management model that involves students from the planning, organizing, implementation, monitoring, and evaluation stages so that the entrepreneurial attitudes of students are trained and developed. The teaching factory management model has been developed based on input/advice from experts. The results of the validity fall into the good category and are feasible to apply this is in line to Arikunto's opinion, (2013: 211).

The teaching factory management model that has been developed is effectively used, this is evidenced by the pretest and posttest tests using the Paired Sample T-test obtained sig. (2-tailed) 0,000 <0.05, it was concluded that there was a significant difference from the posttest results better than the pretest results, this is in accordance with the opinion of Sukestiyarno (2014: 199). The results of the calculation of increasing tests (N-Gain) showed an increase in student learning outcomes by 0.31 for the aspects of attitude, 0.33 for aspects of knowledge, and 0.50 for aspects of skills with a category for all aspects is "Medium".

The validity of the test questions using the results of calculations using the SPSS software program computer, interpretation is based on the value of sig at the output that is the result of the value

of sig <0.05 then the instrument is declared valid, this is following the opinion of Widoyoko (2017: 156-157). At the reliability level by using the Alpha coefficient formula, it is obtained the coefficient value> 0.5 is considered to be fulfilling, per the opinion of Supranata (2004: 114).

This development of teaching factory model is easy to use, it is proved by students' responses in the questioner, the result of this research shows 3,35 average score, it means "very practical", this result is in line with Sugiyono explanation (2016:118).

CONCLUSION

The development model of teaching factory management produces a final result that emphasizes developing students' entrepreneurial attitude. This result appropriate with real entrepreneurial by inviting students to join directly and give the students responsibility in the stage of planning, organizing, implementing, and evaluating. This management model can develop students' entrepreneurial attitude by indicating several attitudes: discipline, hard work, creativity, teamwork, honest, and service goal-oriented. Furthermore, this model can be used to improve students' knowledge and skill in the field of motorcycle engineering.

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REFERENCES

Afonso, P. (2018). Collaborative Machine Tool design : the Teaching Factory paradigm Collaborative Machine Tool design : Conference the Teaching Factory paradigm Costing models for capacity optimization in Industry Tra. *Procedia Manufacturing*,*23*(2017),123–128.

Arikunto, S. 2013. *Prosedur Penelitian suatu Pendekatan Praktik*. Yogyakarta: Rineka Cipta.

Arikunto, S. 2018. *Dasar-Dasar Evaluasi Pendidikan Edisi 2* . Jakarta: Bumi Aksara.

BPS. 2019. *Agustus 2019: Tingkat Pengangguran Terbuka (TPT) sebesar 5,28 persen*. https://www.bps.go.id/pressrelease/2019/11/05/1565/agustus-2019--tingkat-pengangguran-terbuka--tpt--sebesar-5-28-persen.html (diunduh 16 Desember 2019)

Chryssolouris, G., Mavrikios, D., & Rentzos, L. (2016). The Teaching Factory: A Manufacturing Education Paradigm. *Procedia CIRP*, *57*, 44–48. https://doi.org/10.1016/j.procir.2016.11.009

Direktorat Pembinaan SMK. 2016. *Grand Design Pengembangan Teaching Factory dan technopark di SMK*. Jakarta: Direktorat Jenderal Pendidikan Dasar dan Menengah.

Direktorat Pembinaan SMK. 2017. *Tata Kelola Pelaksanaan Teaching Factory*. Jakarta: Direktorat Pembinaan SMK.

Isnaini, A.. 2012. *Berani Berwirausaha!.* Surabaya: Insan Cendekia

Jailani., Rusdarti., & Sudarma, K. 2017. "Pengaruh Kewirausahaan, Motivasi Belajar, Sosial Ekonomi Orang Tua dan *self Efficacy* Terhadap Minat Berwirausaha Siswa". *Journal of Economic Education* 6 (1) (2017) 52-59.

Kuat. (2017). Penumbuhkan jiwa kewirausahaan melalui implementasi edupreneurship di Sekolah Menengah Kejuruan.*Seminar nasional pendidikan 2017 (snp 2017), issn: 2503-4855. 2017*(Snp), 40–46.

Kurniawan, R. (2017). Pengaruh Penerapan Model Pembelajaran Teaching Factory 6 Langkah (Tf-6M) Dan Prestasi Belajar Kewirausahaan Terhadap Minat Wirausaha. *Innovation of Vocational Technology Education*, *10* (1), 57–66. https://doi.org/10.17509/invotec.v10i1.5092

Kuswantoro, A. 2014. *Teaching Factory Rencana dan Nilai Entrepreneursip.* Yogyakarta: Graha Ilmu.

Moleong, L. 2008. *Metodologi Penelitian Kualitatif*. Bandung: Remaja Rosda Karya.

Müller-Frommeyer, L. C., Aymans, S. C., Bargmann, C., Kauffeld, S., & Herrmann, C. (2017). Introducing Competency Models as a Tool for Holistic Competency Development in Learning Factories: Challenges,

Example and Future Application. *Procedia Manufacturing*, *9*, 307–314. https://doi.org/10.1016/j.promfg.2017.04.015

Nurtanto, M., Ramdani, S. D., & Nurhaji, S. (2017). Pengembangan Model Teaching Factory Di Sekolah Kejuruan. *Prosiding Seminar Nasional Pendidikan*, 467–483.

Purwidyantini, S. H., Prajanti, S. D. W., & Widiyanto. (2017). Factory Students of Vocational High School Negeri 2 Kendal. *Journal of Economic Education*, *6*(2), 161–168.

Rentzos, L., Doukas, M., Mavrikios, D., Mourtzis, D., & Chryssolouris, G. (2014). Integrating manufacturing education with industrial practice using teaching factory paradigm: A construction equipment application. *Procedia CIRP*, *17*, 189–194. https://doi.org/10.1016/j.procir.2014.01.126

Saroni, M. 2012. *Mendidik & Melatih Entrepreneurship Muda*. Yogyakarta: Ar-Ruzz Media

Setyawan, D., Hidayat, D., & Suherman, A. (2016). Meningkatkan Sikap Enterpreneurship Siswa Melalui Penerapan Model Pembelajaran Teaching Factory 6 Langkah. *Journal of Mechanical Engineering Education*, *1*(1), 35. https://doi.org/10.17509/jmee.v1i1.3734

Siswanto, I. 2015 " Teaching Factory Program Keahlian Teknik Otomotif". *Prosiding Seminar Nasional Pendidikan Teknik Otomotif UMP*. 23 Mei 2015

Sukestiyarno. 2014. *Statistika Dasar*. Yogyakarta: Andi.

Sukmadinata. 2015. *Metode Penelitian Pendidikan*. Bandung: Remaja Rosda Karya.

Sugiyono. 2016. *Metode Penelitian Kuantitatif, Kualitatif, Dan R & D*. Bandung: Alfabeta.

Sugiyono. 2017. *Metode Penelitian & Pengembangan Untuk Bidang : Pendidikan, Manajemen, Sosial, Teknik*. Bandung: Alfabeta.

Supranata. 2004. *Analisis, Validitas, Reliabilitas dan Interpretasi Hasil Tes* . Bandung: Rosda.

Widoyoko. 2017. *Evaluasi Proses Pembelajaran*. Yogyakarta: Pustaka Pelajar

Wijaya, M. B. R., Tri, A., Rachman, M., & Mantja, W. (2014). *The Journal of Educational Development* " PROCOM CAKEP " In The Field Of Engineering Technology, *2*(1), 53–61.