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# EDUPRENEURSHIP IMPLEMENTATION THROUGH TEACHING FACTORY ON MECHANICAL ENGINEERING EXPERTISE COMPETENCE AT SMK MUHAMMADIYAH 1 SUKOHARJO

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## ABSTRACT

This study aims to 1) describe how the edupreneurship implementation through teaching factory (TEFA) on the mechanical engineering expertise competence at SMK Muhammadiyah 1 Sukoharjo, 2) describe the factors supporting the successful implementation of edupreneurship through teaching factory on the mechanical engineering expertise competence at SMK Muhammadiyah 1 Sukoharjo, and 3) describes the contribution of the edupreneurship implementation through the teaching factory in fostering an entrepreneurial spirit in mechanical engineering students at SMK Muhammadiyah 1 Sukoharjo.

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This qualitative research used a descriptive approach. The data were collected by interview, observation, and documentation. The informants comprised principals, vice principals of curriculum, heads of engineering expertise programs, productive teachers, and students. The data analysis technique employed interactive analysis techniques, starting from data collection and then the data were reduced; after being reduced, the data were presented, and the last was verification. The data validity was then tested by triangulation of sources.

The findings in this study revealed that 1) in terms of planning, organizing, implementing, and monitoring/evaluating, the edupreneurship implementation through teaching factory on the mechanical engineering expertise competence at SMK Muhammadiyah 1 Sukoharjo has been going very well, by producing medical device products, especially patient beds that were produced and have been marketed to PKU Muhammadiyah Hospital in Central Java. 2) The factors driving the success of edupreneurship through technology factory comprised: a quality educator resources; adequate infrastructure both in quantity and quality; standard operating procedures according to industry standards; quality products; a well-established product marketing network. 3) The edupreneurship implementation through the teaching factory contributes to fostering an entrepreneurial spirit by directly involving students in planning, production, and marketing.

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**KEYWORDS:** Edupreneurship, teaching factory, entrepreneurial spirit:

## Introduction

Edupreneurship is an entrepreneurial activity in education to become a creative, innovative, and excellent school and can earn income from the activities carried out (Mulyatiningsih, E., 2014). Edupreneurship activities support the success of educational institutions to be excellent. An educational institution is declared excellent if it can empower educators and students to become successful people and contribute to the success of their institutions. The success of vocational education institutions, specifically, is judged by how much their graduates can be absorbed in the world of work or entrepreneurship. To become an excellent institution, vocational high school is expected to prepare students to have work competencies according to the demands of the industrial world or provide various knowledge and skills to become entrepreneurs. In addition, the concept of edupreneurship is emphasized in the efforts made by the school creatively and/or innovatively to gain school excellence in the form of achievement and increase income. School achievement may not immediately lead to material gains, but excellent schools have more opportunities to receive better rewards, assistance, and student input. With this achievement capital, the school will gradually progress to become an excellent school. Excellence may also not have an immediate financial impact, but it does pave the way for a more successful future. After becoming an excellent school, opportunities to find additional income will also be easier to obtain.

Edupreneurship is driven by the principal as a leader and manager in the school. Principals who become edupreneurs are people who can organize and manage a school institution with full initiative, always innovate, and dare to take risks. There are at least five behaviors of principals to become edupreneur principals: (1) acting as agents of change; (2) leading selflessly; (3) bringing a new culture, which is expected with full confidence; (4) supporting risk-taking and continuous learning; (5) willing to invest and utilize existing resources; even when resources are scarce, leaders are willing to invest (Oxford Project, 2012). Further, teaching factory learning is the right thing to do for students to have competencies in accordance with the world and industry. Teaching factory learning brings learning

closer to the actual situation regarding the curriculum, how it works, work culture, and work discipline, providing competencies as demanded by the world of industry and work.

Edupreneurship through teaching factories is implemented by means of students carrying out learning activities similar or almost similar to those carried out in the business and industrial world. Teaching factory is a learning concept in a real situation to bridge the competency gap between the knowledge provided by the school and the needs of the industry. Hasbullah (2010) stated that the teaching factory (TEFA) is a learning approach based on the production process and learning in the world of work. Learning through the teaching factory aims to develop the characters and work ethics (discipline, responsibility, honesty, cooperation, leadership, and others) needed by the business world and industry and to improve the quality of learning outcomes by simply equipping competence (competency-based training) becoming learning that equips the ability to produce goods/services (production-based training).

However, the implementation of teaching factory learning in vocational high schools, particularly, is still not in accordance with the actual demand of learning, so graduates are not accepted in the industrial world and the world of work. The phenomenon revealed that vocational high school graduates do not yet have high competence, so their competence is still not recognized by the business world and the industrial world (Hartanto, Ratnasari, & Arifin, 2019; Torun, 2017). This is in accordance with the results of Yunianto's research. In general, the implementation of the Teaching factory in the Boutique Fashion Design skill program at SMKN 2 Gedangsari Gunung Kidul has not gone well. The activities carried out have not been able to run optimally in a sustainable manner. In addition, the involvement of productive teachers and students is also not maximized in teaching factory learning. As a result, the results of the seven parameters consisting of teaching factory management, workshop and laboratory management, training learning, communication media, products and services, teaching factory

resources and industrial relations have not been maximally achieved. (Yunianto, 2016)

In this case, the mechanical engineering expertise competence at SMK Muhammadiyah 1 Sukoharjo has carried out teaching factory activities since receiving block grand teaching factory assistance from the government. At first, it could not develop because it was still doing early activities and experimenting. However, since becoming a center of excellence school, it has later become a center of excellence for teaching factory activities that developed rapidly and in harmony with the construction of a technopark. Thus, teaching factory activities can use a large area of land accompanied by the fulfillment of increased machine facilities by buying CNC machines and welding cutting machines. Teaching factory activities are also developing, especially after producing medical devices in the form of patient beds, patient waiting chairs, and others.

On the other hand, getting students' entrepreneurial spirit is vital so that vocational school graduates are not unemployed. In this case, the policies made by the Indonesian government are to improve the quality of human resources through education, instill an entrepreneurial spirit at every level of education, and seek to expand employment opportunities. In schools, efforts to develop an entrepreneurial spirit are carried out with edupreneurship activities such as business centers and teaching factories. The growth of an entrepreneurial spirit through a business center is carried out through business practice activities by students (Kuat. T. 2015). Meanwhile, the psychological aspects that characterize individuals are said to have an entrepreneurial spirit and attitude, according to Suryana (2006), are a) Confidence in determining something, confidence in doing things, and confidence that they can overcome various risks faced are the basic factors that entrepreneurs must own. Someone with an entrepreneurial spirit feels confident that whatever he does will succeed even though he will face various obstacles. He is also not always haunted by the fear of failure, making himself optimistic about keeping going. b) Initiative (energetic and confident): in dealing with the dynamics of life full of changes and problems, an entrepreneur will always try to find a way out. They do not want their lives to

depend on the environment, so they will continue trying to find a way out. c) Having achievement motive: various targets to achieve success in life are usually and always designed by an entrepreneur. One by one, their targets continue to be achieved. When faced with a failed condition, they will continue to try to improve the failure they experienced. Success after success achieved by someone with an entrepreneurial spirit makes it a trigger to continue to achieve success in his life. For them, the future is success and beauty to be accomplished in life. d) Having a leadership spirit (dare to be different and take calculated risks): leadership is a key factor in becoming a successful entrepreneur. e) Liking a challenge: people may often read or witness several cases of a manager or executive resigning from a company to become an entrepreneur.

1 Based on the background of the problem above, the problem formulations in this research are 1. How is the edupreneurship implementation through the teaching factory on the mechanical engineering expertise competence at SMK Muhammadiyah 1 Sukoharjo? 2. What are the supporting factors for the successful implementation of edupreneurship through teaching factory on the mechanical engineering expertise competence at SMK Muhammadiyah 1 Sukoharjo? 3. How is the contribution of the edupreneurship implementation through the teaching factory in fostering the entrepreneurial spirit of students in the mechanical engineering expertise program at SMK Muhammadiyah 1 Sukoharjo?

#### 15 Method

The type of research used in this research is qualitative research. Qualitative research is used to understand a phenomenon or an event in the field related to what is experienced by the research subject. Qualitative research is used to understand certain situations, events, roles, groups, or social interactions. This qualitative research uses a descriptive approach, to describe or analyze a research result but is not used to make broader conclusions. The research was conducted in the mechanical engineering expertise of SMK Muhammadiyah 1 Sukoharjo. The informants for this research comprised principals, vice-principals of curriculum, heads of engineering expertise programs, productive teachers, and students.

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Collecting data in this study utilized interviews, observation, and documentation. The data analysis technique used interactive analysis techniques, starting from data collection regarding teaching factory learning and then data were reduced; after being reduced, the data were presented, and the last was verification. (Miles and Huberman, 2014). To test the data validity, triangulation was performed. This study employed triangulation of 24 sources by comparing information through observation, interviews, and documentation. From the results of these studies, evidence would be obtained in accordance with the phenomenon under study.

### Findings and Discussion

#### The edupreneurship implementation through teaching factory on the mechanical engineering expertise competence at SMK Muhammadiyah 1 Sukoharjo

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The implementation of edupreneurship through teaching factory competence in mechanical engineering skills at SMK Muhammadiyah 1 Sukoharjo is seen from planning, organizing, implementing, and monitoring/evaluating as follows:

##### a. Planning

The planning of the TEFA workshop on the mechanical engineering expertise competence at SMK Muhammadiyah 1 Sukoharjo aimed to prepare the implementation to run well. The initial planning was carried out from making the stipulation and the teaching factory program. Planning began with the selection of human resources, aimed to determine the 7 minimum competence of teachers according to the needs of the mechanical expertise teaching factory program. The recruitment of teachers was conducted in accordance with the required competencies with a minimum undergraduate qualification from the Faculty of Teacher Training and Education, Department of Mechanical Engineering. To improve the performance and productivity of teachers, competence was increased by being sent to educational and training institutions (DIKLAT) or internships in the industry. According to Ismail M. E. et al. (2018), teachers need creativity and flexibility to create active conditions for students during the learning

process and create educational experiences which enable the development of creativity among their students.

Product planning also aimed to ensure that the product met the quality and market needs. The products were in the form of medical devices, such as patient beds, patient waiting chairs, patient dining tables, first aid kits, and others. Product planning was carried out on an ongoing basis to maintain product quality to keep good customer service. In this case, every product entry and exit was always recorded to make it easier for the teacher to check the product's condition. The data were used to determine what products were needed by consumers and improve quality in accordance with industry standards. Some of the proceeds from product sales were used to develop teaching factory facilities and infrastructure. This is in accordance with Sudiyono' (2019) which states that program planning related to products/services to be produced is generally still on the type of product based on orders, not yet on product innovation, the number of products to be produced, and product sustainability.

Furthermore, marketing planning at the TEFA workshop on the mechanical engineering expertise competence at SMK Muhammadiyah 1 Sukoharjo used the marketing concept of STP (segmentation, targeting, positioning) with a marketing mix model of 7P (product, price, place, promotion, process, people, physical evidence). The marketing target segment is PKU Muhammadiyah Hospitals throughout Indonesia. In the initial stage, it is targeted to meet the needs of PKU Muhammadiyah hospitals in Central Java. In addition, aside from the use of social media as the main means of promotion, other forms of promotion were also with affordable product prices, accompanied by product quality maintained and equipped with good service as the primary promotion.

Then, financial planning at the TEFA workshop on the mechanical engineering expertise competence aimed to protect the workshop finances from the impact of complex activities. Initial capital was used to develop capital (production). Finance came from assistance from the Ministry of Education and Culture and capital from the school itself.

#### b. Organizing

The organization of the TEFA workshop on the mechanical engineering expertise competence at SMK Muhammadiyah 1 Sukoharjo aimed to determine the division of personnel and each task and authority in carrying out their duties. The TEFA workshop has its management structure outside of the school management structure. The management structure is useful for facilitating the division of tasks in the organizational structure in the TEFA workshop. The division of tasks for the TEFA workshop unit at SMK Muhammadiyah 1 Sukoharjo was divided into responsible persons with the positions of director, stakeholder, implementation coordinator or chairman, head of the workshop of teaching factory production unit, secretary, treasurer, teachers, employees, and students. In the teaching factory at SMK Muhammadiyah 1 Sukoharjo, the person in charge also served as the director of TEFA. In addition, the preparation of the organizational structure made detailed job descriptions, so there was no overlap and could coordinate well. This is in accordance with research conducted by Sanatang (2020) which states that the organization is carried out through the establishment of the TEFA organizational structure, job descriptions and standard operating procedures for each department's activities, but the implementation of each department's activities has not been well documented. The human resources involved in the organizational structure are all internal to the school, there is no participation from the relevant government

In organizing production, the production schedule was written after the teaching factory workshop received orders from consumers. It made it easier to determine work and anticipate a student work system that used a rolling system so that students were not burdened with learning hours. In addition, product sales data were used to determine the number of products sold and where the products were sold.

#### 5 Implementing

The implementation of teaching factory learning on the mechanical engineering expertise competence involved students, i.e., students of class XI and XII on the mechanical engineering expertise competence. The learning process with the teaching factory implementation on the mechanical engineering

expertise competence began with planning the approach application of the teaching factory learning model, carried out by applying an industrial culture approach, setting up school practice laboratories adapted to conditions in the industry, and applying the block system learning hours. The implementation of learning strategies and systems was prepared by adjusting the industry-based curriculum, selecting and implementing learning strategies appropriate to the learning conditions, and utilizing the production unit as a place and a good learning environment. In addition, the making of learning job sheets was in accordance with the needs of the industry. The management of practical learning facilities and infrastructure was also added by constructing a teaching factory building, which has equipment facilities in accordance with industry standards and is separate from the school building. Management was also carried out by applying industrial environmental management standards, such as spatial planning, equipment, and waste management.

Moreover, the process of implementing teaching factory learning at SMK Muhammadiyah 1 Sukoharjo began with an introduction to practical learning, starting from preparing to wear practical clothes and personal protective equipment (PPE). Preliminary learning was done by opening, praying, checking student attendance by the teacher or instructor, and continuing with the division of work or practical jobs. Especially for class XI and XII, who had their turn rolling, they would practice in the production building of the TEFA workshop.

The process of implementing the practice also began with an explanation and direction to the job, work safety, and an explanation of the purpose of the practice carried out by the teacher or instructor. Implementation of the practice was in accordance with the job given and directed. Students learned to analyze, solve problems, and make reports or records of the work. The teacher or instructor also monitored and guided the practicum process.

Products in medical devices resulted from the practicum carried out in the TEFA workshop in the form of medical devices, especially patient beds that have been produced and marketed to PKU Muhammadiyah hospitals in Central Java.

Unit, where the standard operational procedure (SOP) was used in carrying out all types of

work. Related to this, students need to be trained for emergency conditions and limited tools, which are expected to grow and develop their creativity (Efendi, Y. & Sudarwato, 2018). Then, sales of service products were carried out by employees with the help of students as implementers. Proceeds from product sales were used as production funding, divided for operational costs, employee salaries, and school income funds. It confirms that the TEFA workshop became income for schools in accordance with the TEFA concept.

The implementation of teaching factory learning on the mechanical engineering expertise competence has been proven to involve students, namely students of class XI and XII, in the mechanical engineering expertise competence.

#### d. Monitoring and evaluating

Supervision activities are needed to record the progress of the teaching factory, monitor the process and progress of implementing policies continuously, identify problems and deviations that arise, formulate problem-solving, and make progress reports regularly in a short period.

Evaluation is an effort to assess something technically and economically for the possibility of implementing development. In the teaching factory implementation, evaluation means an assessment of the learning model that has been implemented to make continuous improvements. Through the evaluation process, the institution could consider the strengths and weaknesses of the elements influencing the teaching factory implementation at SMK Muhammadiyah 1 Sukoharjo and get an idea to improve the quality and quality to support the successful implementation of the teaching factory.

It is supported by the research results by Putra and Suyanto (2021), which stated that the research results showed that planning, organizing, implementing, and supervising were in accordance with the teaching factory concept on the motorcycle engineering and business expertise competence at SMK Ma'arif 1 Wates were carried out well but not optimal. In addition, in their study, 65% of students had been involved in organizing and implementing, while for planning, organizing, and evaluating, 100% were carried out by the management

team of the teaching factory unit on the motorcycle engineering and business expertise competence at SMK Ma'arif 1 Wates.

Based on the data above, the implementation of edupreneurship through teaching factory competence in mechanical engineering skills at SMK Muhammadiyah 1 Sukoharjo seen from planning, organizing, implementing, and monitoring/evaluating has gone very well, by producing medical equipment products, especially patient beds that have been produced and marketed to PKU hospitals. Muhammadiyah in Central Java.

#### **The driving factor for the successful implementation of edupreneurship through teaching factory on the mechanical engineering expertise competence at SMK Muhammadiyah 1 Sukoharjo**

The successful implementation of edupreneurship was supported by several factors. First, human resources had high competence because the number of teachers in the mechanical expertise program was five, all of whom had undergraduate backgrounds. Improving teacher competence was also carried out by involving productive teachers in education and training activities held by the government. Thus, all teachers had attended education and training. Another effort was to attend industrial internships; all five productive teachers had taken industrial internships. From these data, it can be concluded that human resources, especially productive teachers related to the teaching factory learning implementation, all had an undergraduate background and had attended education, training, and internships.

Second, the facilities and infrastructure owned were in the form of a four-story building with sufficient classrooms; in each class, there was air conditioning, Wi-Fi facilities, and LCD. The teaching factory laboratory had facilities for CNC machines, lathes, cutting machines, welding tools, and painting tools. In addition, there was room for painting the product in the context of finishing the product. Third, work operational standards refer to work standards in the industry in terms of work culture, production work standards, and work safety standards under the guidance of experienced supervisors.

Fourth, the products produced in the teaching factory had high quality because each product had passed the quality test in collaboration with the university's engineering faculty laboratory. The product results were in the form of medical devices, including patient beds, patient waiting chairs, push tables for patients eating, tools for placing infusions, first aid kits, and modifying ambulance cars. Fifth, the product marketing network had been well established by holding an MOU with PKU Muhammadiyah Hospitals in Central Java so that the need for hospital beds could be met from the teaching factory of SMK Muhammadiyah 1 Sukoharjo. PKU hospitals that have purchased patient beds are PKU Sukoharjo, PKU Surakarta, PKU Gombong, PKU Karanganyar, PKU Tegal, and others. Meanwhile, modifying ambulance cars from the community was also quite a lot.

The driving factor for the successful implementation of edupreneurship through the teaching factory is supported by the Sanatang (2020) research results, revealing that: 1) the TEFA implementation in the TKJ expertise program at SMK Negeri 5 Makassar was going well because it applied management principles, i.e., planning, organizing, implementing, and controlling, supported by TEFA components: human resources, administration and finance, equipment, curriculum, learning, products, and marketing. (2) The TEFA implementation in the TKJ expertise program at SMK Negeri 5 Makassar was also running due to supporting factors, including (a) principals who had an entrepreneurial spirit and enthusiasm to develop TEFA; (b) some TEFA managers and instructors (teachers and employees) had attended industry training; (c) adequate equipment facilities; (d) support from students who were always enthusiastic in the TEFA learning process; (e) there was support from the business and the partner industry world, although the number of participating industries was still lacking. Also in line with research conducted by Sudyanto (2018) which states that the supporting factors for implementing the teaching factory at SMK St. Mikael Surakarta is a good culture or culture, competent human resources in their field, and adequate equipment facilities. Also supported by the results of Muhitasari' (2018) the supporting factors in teaching factory learning are infrastructure facilities according to industry standards and competent teachers, and also in line with the results of Kurniasari's research (2022) which

states that the supporting factors include: competent teachers, supporting facilities and infrastructure, enthusiastic students, toolman, block system practicum schedule, and collaboration with DUDI, the inhibiting factor is less than optimal time, marketing and a less strategic place. Cusmadi (2022) The supporting factors for the curriculum aspect, teacher human resources, facilities and infrastructure, support from DUDI partners, and the management of TEFA products show good and very good categories. (3) Obstacles and implementation solutions are identified and resolved through a consensus meeting at SMKN 4 Balikpapan

### **The edupreneurship implementation through the teaching factory contributes to fostering an entrepreneurial spirit.**

Teaching factory activities could contribute to increasing the students' entrepreneurial spirit if the activities carried out are in accordance with the competencies learned. At SMK Muhammadiyah 1 Sukoharjo, the edupreneurship implementation through teaching factory activities was carried out in accordance with competence in engineering expertise. In addition, the activities done will contribute more positively if they involve students, starting from planning and production to marketing processes.

The involvement of students in the planning, production, to marketing processes is also needed to provide students with direct experience in entrepreneurship. In accordance with what was done at SMK Muhammadiyah 1 Sukoharjo, students were involved since receiving orders, and then orders were analyzed between the supervising teacher and students. Then, it was drawn, and the students worked out the order from the base of the picture. The supervising teacher controlled the quality of the work, and to ensure the continuity of the product and to maintain quality in product testing, collaboration with universities was conducted. After the product was finished, it was handed over to the customer. In marketing activities, students were also involved in printing product catalogs and advertising through existing social media. In other words, after getting an order, students design the product to be made, carry out production, and determine the price consumers must pay. In one activity, students could gain experience in



planning, producing, marketing, and managing finances.

Based on the experience of successful schools in implementing teaching factories and contributing to the improvement of students' entrepreneurial spirit, the strategy that must be carried out is to involve students directly in the entire business process. It needs to be emphasized because, in general, schools still involve students in teaching factory activities, limited to production activities. As a result, students do not know whether the resulting product sells well, how much it costs, and how much profit it will make. It is supported by Siswanto's (2011) research results, stating that teaching factories can contribute to improving students' entrepreneurial spirit by involving students directly in the entire business process from planning, production, and marketing. This is also in line with the results of Nabiba (2020), which states that the product of the teaching factory program provides positive results in the form of creating an industrial culture that is able to increase productive competencies and foster students' entrepreneurial spirit, as well as produce products/services that have added value with absorbable quality, and accepted by society.

### Conclusion

1. Judging from planning, organizing, implementing, and monitoring/evaluating, the edupreneurship implementation through teaching factory on the mechanical engineering expertise competence at SMK Muhammadiyah 1 Sukoharjo has gone very well, by producing medical device products, especially patient beds that have been produced and marketed to PKU Muhammadiyah Hospitals in Central Java.
2. Factors driving the success of edupreneurship through factory teaching included: a). quality educator resources, b). adequate infrastructure, both in quantity and quality, c). standard operating procedures work according to industry standards, d). quality products, e). well-developed product marketing network.
3. The edupreneurship implementation through the teaching factory contributes to fostering an entrepreneurial spirit by directly

involving students in planning, production, and marketing

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