



Added value of teaching factory learning in services production unit to prepare graduate work readiness

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ABSTRACT

Teaching Factory (TEFA) Learning Model is a means of improving students' skills to meet the qualifications required by the workplace. There is a discrepancy between the output performance criteria of vocational school graduates and the job qualifications required in the industry. The industrial world is rapidly advancing in technology and information, while schools are struggling to provide adequate laboratory and practical facilities. This study examined the students' perspectives on TEFA learning in service production units in vocational schools to prepare them *considering* graduate work readiness (GWR). The research employed a descriptive qualitative approach with the data collection techniques utilizing in-depth interviews and observations. The research participants were students *at* vocational schools joining the TEFA teaching and learning program. The collected data were then validated using source triangulation. The data analysis followed a qualitative method with an interactive model as realized in several stages: data collection, data reduction, data display, and conclusions. The findings showed that students' perspectives on TEFA learning inform added values in 3 domains: 1) knowledge, 2) skills, and 3) attitudes. Furthermore, TEFA learning provided students with the necessary competencies which align with the performance criteria required by the industry, boosted their self-confidence and learning motivation, and fostered a mental attitude of independence, responsibility, and self-efficacy in meeting industrial needs.

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INTRODUCTION

Work readiness, or a state of being equipped with the necessary skills to successfully thrive in the workplace, would be the natural expectation perceived by students upon graduating. They would foresee that their learning outcomes would equip them with work-ready skills or self-reliance in working, as is one of the objectives of vocational schools. However, a preliminary observation suggests that the vocational school graduates' competencies have yet to meet the performance criteria required in the industry. Laboratory facilities have struggled to meet the demands of technological development in the industrial world. Meanwhile, students also do not possess the necessary mental maturity and work experience. Industrial involvement is necessary for the development of performance criteria for learning outcomes (LO), learning outcome programs (LOP), learning processes, and evaluations in vocational schools.

Work readiness is an essential factor in meeting the qualifications required by businesses and industries (Education Council, 2014; Raftopoulos et al., 2009). To obtain highly competitive workforce candidates, work readiness must be prioritized as the supply of work outweighs the demand. Work readiness is indicated by combined conformity between physical maturity, mental maturity, and experience so that students can carry out activities at work. Based on a review of work readiness in relation to stakeholders, challenges in graduate work readiness may be addressed by human resources professionals in partnership with key stakeholders (Verma et al.,

2018). Under this consideration, the teaching factory learning model offers great potential to enhance work readiness by using relevant materials for industrial needs.

Even when some recruitment process pays less attention to work readiness (Herbert et al., 2020), employees who demonstrate work readiness would be able to understand the job descriptions easily and work skilfully, thereby avoiding risks of work accidents. The industry would no longer need to carry out education and training programs and the employees could improve their careers easier and faster. The high unemployment rate of 8.40 million Vocational High School graduates reinforces the importance of work readiness. The reality is that even though schools provide various subjects, both theoretical and practical, they still fall short in promoting work readiness. Therefore, schools need to collaborate with the industry to jointly foster students' self-efficacy to be work-ready through the implementation of the TEFA model.

Teaching Factory (TEFA) connects schools with the working industry and acts as a bridge to aid the students in meeting the qualifications in the work readiness department. This would lead to employment readiness, specifically in the areas of subject knowledge, communication, comprehension, relevant skills, adaptability, flexibility, and willingness to perform well (Agwa-Ejon & Pradhan, 2017). When students are work-ready, they will develop self-confidence or self-efficacy. This serves as motivation to cultivate enthusiasm for self-improvement, enjoy work more, enhance skills, engage in critical thinking, and adapt to the work environment (Hakim et al., 2023). Therefore, efforts to reduce the gap and unemployment problem can be made by producing graduates who are ready for work through the appropriate learning model.

It is important that students achieve learning outcomes that adhere to industry and work standards (Chen, 1998; Diwanggoro & Soenarto, 2020; Mason et al., 2009). The TEFA model is an alternative solution because the learning syntax of this model starts from the planning or determination of learning objectives/performance criteria, the implementation of the learning process, and the assessment involving industry practitioners. In minimizing the gap, schools and industries must collaborate to prioritize both hard and soft skills necessary for work through the design of the learning process. Therefore, school graduates will meet the job demands of the industrial world as a readily competent workforce.

The implementation of TEFA learning starts from the collaboration between schools and industries. Learning is designed by teachers together with industrial instructors. They are to make an agreement to determine performance criteria which will be the basis of learning outcomes. During the determination stage, performance criteria should reflect industry needs and adapt to the pertinent curriculum. Instructors from the industry collaborate with teachers to create a job sheet that outlines the necessary steps for the learning process. Learning that focuses on performance criteria includes, as elements of evaluation, the values that exist in the industry.

The learning and assessment process involves teachers and practitioners and focuses on students' ability to work as well as their work attitudes and behavior by means of observation. Students are identified based on their types or preferences in learning. The pragmatists learn best using a mixture of behaviorist and humanist approaches such as tasks and case studies, while the reflective learners learn best from the humanist approach such as discussion. At the end of the TEFA learning, reflection is carried out to deliberate on the challenges of meeting the performance criteria which involves teachers, students, and practitioners. In the context of TEFA learning, aspects of knowledge and skills will lead to well-organized learning. Young people use knowledge and skills in a definite order, with one step succeeding another (Johnson, 2002). In turn, prospective employees would eventually obtain tacit knowledge in relation to the practices of future work and career development.

The TEFA model provides students with a learning experience that simulates the real working industry. The experience adds such values as mentally preparing students in the development of work readiness as well as perseverance in a competitive work setting. The current work presents a novel approach to integrating industry with academia under the concept of teaching factory as tested on real pilot application (Rentzos et al., 2015). It is thus advised to develop a policy to support the continuous implementation of the TEFA model in vocational high schools.

The need for the implementation of the TEFA learning model in the service sector is triggered by the poor number of absorptions of vocational graduates in the industry (Habiba et al., 2020). The assumption is that the graduates' competencies do not align with the needs of the industrial world. Efforts to prepare competent graduates require collaboration between schools, industry, and government/non-government institutions, especially in the learning department (Purwanto et al., 2022). Good management of the cooperative relationship and partnership offers a win-win solution for all parties, which leads to TEFA-based learning granting more value in preparing students to meet the required competencies in the industry (Habiba et al., 2020; Yusri & Sulistyowati, 2020).

Vocational schools have a significant role in helping students master both hard and soft skills so that they are equipped with highly competitive power to enter the industry (Wibawa, 2005). The TEFA model provides students with the skills that take into consideration the requirements and demands of the industry. The learning outcomes expected of the vocational school graduates are oriented to real work applications that adhere to performance criteria and prospects for good career development.

The future demands high-quality learning that includes life and career skills, learning and innovation, information, media, and technology (Trilling & Fadel, 2009; Wibawa, 2005). As technology advances, learning methods must adapt to meet the needs of the workforce and provide transferable skills. Innovation of developmental methods may be achieved through a pilot project with the Learning Factory/Teaching Factory approach (Krückhans et al., 2015). The TEFA-based learning concept revolves around students producing goods and services. However, while the aspect of goods production has been widely studied (Chryssolouris et al., 2016; Habiba et al., 2020; Martawijaya, 2012; Mavrikios et al., 2018; Mustari et al., 2017), the TEFA model which focuses on services, that is the one oriented towards improving students' service skills based on the performance criteria of the demands in the industry, has not been found.

The output of such TEFA-based learning would contribute to the industry in the service sector, where students who are declared masters are given certificates and would get the opportunity to work as volunteers, part-time, and professionals. It is also necessary to conduct research on students' perspectives on TEFA learning that produces competence in the service sector because thus far there has been no TEFA model whose product is in the form of services. This research is expected to contribute to the evaluation of the implementation of TEFA learning, so that vocational schools can organize a learning model that provides added value to the quality of graduates regarding work readiness. Indicators of the study would be observed from the students' perspectives and concern the acquisition of knowledge, skills, and attitudes after they complete the learning program which employs the Teaching Factory model. This study explores students' responses to the added value they receive after participating in learning with the TEFA model. It intends to highlight the importance of implementing the TEFA learning model, particularly in vocational schools.

The concept of the teaching factory is learning that produces products, both goods and services, with schools and the industry working in synergy to produce competent graduates following the demands of the industry (Chryssolouris et al., 2016). It was developed due to the low contribution of vocational schools towards the absorption of vocational graduates in the industry. It is a means of learning for students to gain competence in accordance with the real situations in the industry (Kusmintarti et al., 2021) by trying to reduce the gap between learning output competencies and the qualifications required by the industry as well as the technological developments (Habiba et al., 2020). Its basic concept of Factory-to-Classroom (Presidential Instruction No 9 of 2016, 2016) aims at transferring the real production/manufacturing environment into the classroom. This would enable students to experience a real-life production environment by bringing the knowledge existing in the processes of everyday industrial practice into learning through delivery mechanisms that allow the students to see the full context (Chryssolouris et al., 2016).

Teaching Factory which focuses on services is a learning model that requires a collaboration between schools and industry to produce human resources who are work ready in the field of services (Diwangkoro & Soenarto, 2020; Dwijyanthi & Rijanto, 2022). In this case,

learning is defined as a persistent change in performance potential, referring to the fact that what is learned might not always be exhibited immediately (Reiser & Dempsey, 2021). Learning experiences are designed regarding developing tasks that measure competence and are carried out following the stages of career advancement. Efforts to prepare graduates who are ready to work require regulations at the regional and national level that facilitate collaboration and partnerships between schools and the industry. Skills of time-keeping and personal organization, interpersonal negotiation, and communication, as well as number and technology skills are essentially transferred between different organizational contexts and vocational sectors to prepare students for the demands of employment after graduation (Herbert et al., 2020). In this case, schools act as supply, and the industrial world acts as demand (Prosser & Allen, 1925). To meet the learning outcomes that are oriented toward the learning objectives, the service production unit in vocational schools is to facilitate students by using the TEFA learning model.

The development of a student's career extends beyond graduation and includes job acceptance. As explained by Council (2014) in "Preparing Secondary Students for Work", vocational learning includes career education programs, through which secondary students need to explore the industry, identify career options and pathways, and build career development skills. Vocational learning is integrated into the broader curriculum as career exploration should begin early in secondary school, if not earlier, while students are still shaping their sense of identity, their beliefs about work, and their aspirations for future probabilities.

In TEFA learning Model, schools are oriented toward producing students who can adapt with both hard and soft skills (Putri et al., 2019). The model aims to equip students with the performance criteria needed in the industry (Chryssolouris et al., 2016). TEFA learning on productions of services has several specifications as follows: a) orientation toward service products, b) performance criteria aligned with the industry standards, c) opportunities for skilled students to secure student employment, volunteering, part-time work, or becoming professionals, d) learning materials packaged in job sheets, and e) the goals of learning leading to learning outcomes that align with the needs of the industrial world (Widiatna et al., 2019; Yusri & Sulistyowati, 2020).

The TEFA model can be applied to vocational schools that aim to produce graduates who can manufacture goods and services, such as Vocational Schools that specialize in office governance. The development of lesson plans is a joint responsibility between schools and the industry, with industry instructors directly involved in the learning process, including preparing the lesson plans, observing the learning process, and determining the standard of achievement criteria. Schools provide the place for the learning process following the school and industry agreements. Students' practices can be carried out at schools with complete/representative laboratories or in partner industries. When students are declared to meet all the required learning achievement criteria, they are awarded a certificate in addition to the diploma certificate. Through this certificate, students are to work as student employees/volunteers in their schools or partner industries. The students can also increase their capacity to work part-time or as professional staff if the industry partners require it.

TEFA, which concerns service production units teaches students to improve their service skills and prepare them to be work ready (Martawijaya, 2012). Students can build their performance accordingly through understanding the industry qualifications and completing the performance criteria according to the demands of the industry. TEFA learning encourages responsibility and work readiness in students (Dewi & Sudira, 2018), while also fostering knowledge of work culture, increasing entrepreneurial spirit, and promoting integration into society (Habiba et al., 2020). Industrial assistance in teaching factory will provide participants with valuable learning experiences in real conditions, which eventually will help improve the quality of vocational education (Tjiptady et al., 2019).

The learning process in TEFA model incorporates portfolio assessments and observation rubrics (Trilling & Fadel, 2009), with the assessment technique utilizing Criterion Reference Assessment. Reflection activities are carried out by students, teachers, and industry partners after the learning process. Reflective learning can be further classified into reflection-in-action and reflection-on-action. Reflection-in-action is a real-time reflection that can lead to immediate

changes in behavior during the learning process. Meanwhile, reflection-on-action is undertaken at some distance from the action both metaphorically and, for example, through post-event reviews, briefings on immediate future, or plannings for the long term in team meetings (Dewi & Sudira, 2018; Mavrikios et al., 2018, 2019).

METHOD

The research is descriptive research with a qualitative approach as it aims to explore the students' perspectives on TEFA learning in the production services program. In-depth interviews were employed as they could collect detailed information from the participants, including the emotional aspects or the mental states, to reinforce the comprehensiveness and validity of the results. The interviews covered the aspects of knowledge, skills, and attitudes. Research participants were students from five State Vocational Schools (*Sekolah Menengah Kejuruan*) in the Special Region of Yogyakarta, Indonesia, namely 1) SMK Negeri 1 Depok, 2) SMK Negeri 1 Kulon Progo, 3) SMK Negeri Bantul, 4) SMK Negeri Gunung Kidul, and SMK Negeri 7 Yogyakarta.

These schools were selected as they were pilot schools with representative laboratories and established industry partners. The research participants consisted of 20 students, 4 students from each school, who were chosen as the samples of the research. The data collection techniques were interviews with the randomly selected students who participated in the TEFA learning program. Data collection ended when the data reached redundancy, while the data validity was ensured through source triangulation. Conclusions were drawn through data analysis, data reduction, and presentation in research reports (Sugiyono, 2019). In addition to interviews, observations were conducted to directly assess the learning process.

FINDING AND DISCUSSION

Finding

Based on the research findings, most of the students as participants confirmed that they noticed added value in the case of fostering work readiness. The job sheet used as the learning guide provided insights related to the performance criteria that need to be trained and served as a new experience for students. The collaborative nature of the model involving the industry instructors and the teachers reinforced students' self-confidence, assuring them that what is being taught aligns with what the industry requires. From the students' perspectives, TEFA learning model also has added value in increasing the domains of knowledge, skills, and attitudes, which strengthen work readiness.

After participating in the TEFA learning, students felt that they: a) gained more insights into the contents of the materials aligning with the industry qualifications (knowledge aspects), b) improved the work skills pertaining to the criteria set out in the job sheet (skill aspects), and c) experienced an increase in self-confidence, learning motivation, and mental attitude including a sense of responsibility in work readiness and industrial work culture (attitude aspects).

The integration of hard and soft skills, which cover the elements of knowledge, skills, and attitudes, strengthens the ability to carry out work in accordance with the guidelines of the industry. For example, when the students were asked, "How do you feel after learning using the TEFA model, especially in terms of potential improvement of the hard skills or soft skills?" One of the students answered, as echoed by majority of them,

"I feel confident to enter the workforce with the guidance of the industry instructors, the use of job sheets, and clear performance goals to achieve. In terms of skills, there is a clear improvement, and regarding attitudes, of course, I have learned how to express the appropriate behaviour while working."

Discussion

The TEFA model ensures that students learn in a structured manner with job sheets with certain considerations of students' psychological aspects. Additionally, during the learning

process, certain values are instilled in and embraced by the students, fostering an industrial culture within the school (Widiatna et al., 2019).

The results of this study support the previous research conducted by Sutianah (2021) where TEFA learning model showed an impact on the improvement of the hard and soft skills of the students. Together, the three domains of knowledge, skills, and attitudes are designed to produce good learning outcomes (Heryaningsih & Khusna, 2018). In addition to this, the participants mentioned that teaching factory models also raises their awareness regarding career development. Overall, the results of the interviews show that after following the TEFA learning, students' perceptions can be described as follows: (1) work readiness is needed to meet the performance criteria required by the industry, (2) self-motivation is necessary to improve the quality of work through knowledge development, and (3) planning and developing a career at work are essential for the long-term survivability. Further, the experience from TEFA learning also strengthens their confidence to be work ready and provides additional insights into mental health development, it is therefore vital in the adaptation process into career development and sustainable working life (Mason et al., 2009).

TEFA learning model offers added value in terms of improving student skills. By training students in the services industry to meet industrial performance criteria, TEFA learning can help improve work skills which lead to actual behavioural change that meets industry qualifications. As students gain more knowledge, they will obtain the necessary skills which enable them to improve work performance. This supports the theory that learning outcomes are behavioral changes that can be observed. Therefore, students who participate in TEFA learning would find the added value of increased motoric skills in line with the industry criteria.

Regarding the aspect of attitude, TEFA learning also positively impacts the students in a way that it increases their self-confidence and motivation to keep improving their skills (Mustari et al., 2017). Based on the interviews, all the students admitted that their experience of learning with the TEFA model made them more aware that they must work seriously in accordance with the quality standards required by the customers. Through the TEFA model, students gain an understanding of work culture and learn how to cultivate a good attitude by considering the cultural aspects at work. Attitudes can be built through continuous practice and learning so that they become patterns of behavior, which ultimately lead to the development of a positive work culture (Dodds, 2016; Jeynes, 2019).

This has an impact on social independence, decision-making, and maturity in dealing with problems at work, all of which contribute to improved work culture behavior. It can be observed from the results of the learning assessment which includes the completion of competencies/sub-competencies from the referenced assessment criteria in work culture. Research shows that TEFA learning makes a significant contribution to the students' work readiness by 34.6%, including such aspects as responsibility, discipline, honesty, cooperation, and leadership (Dewi & Sudira, 2018). When students meet the criteria or achieve the minimum mastery, they may be given opportunities to become student employees, volunteers, or even professional workers. This is defined as institutional accountability (Liu et al., 2012). It supports the belief that the learning process requires encouragement as stimulus to achieve the expected goal. A few obstacles may hinder its effectiveness, however, such as poor planning with respect to following up the Memorandum of Understanding/Implementing Arrangement between industries and schools, as well as issues with scheduling and passive practitioners.

The TEFA model is designed to enhance work readiness and critical thinking skills by taking advantage of the integrated learning and work environments. During the TEFA learning, students apply theoretical knowledge and implement it into real-world working scenarios. This often requires the students to notice necessary adjustments, and consequently, also to develop critical thinking skills to make decisions while performing their services. The TEFA model encourages students to have a positive attitude as they balance their learning in the laboratory with actual work or through modules on work operations, promoting work interest and entrepreneurship. In other words, in addition to improving work readiness, the implementation of TEFA also increases 1) motivation, 2) personal growth, 3) social maturity, 4) work attitude, and 5) work skills (Dwijayanthi & Rijanto, 2022).

Regarding the stages in TEFA learning model, during its implementation, this model highlights the way it can effectively improve the students' academic achievement, metacognitive, and critical thinking skills. Jeynes (2019) explains that the metacognitive consists of two components, knowledge, and experience. Maksum et al. (2022) propose that metacognitive knowledge consists of declarative, procedural, conditional, skills, and beliefs. They explain further that TEFA can improve the metacognitive, which contributes to better understanding of reading, problem-solving, concentration, memory, social skills, control, and independent learning.

The Hybrid Teaching Factory Model is a concept that motivates the move from a traditional curriculum toward a hybrid curriculum structure. This hybrid curriculum combines theoretical knowledge/scientific concepts with the needs of field practice in the industry more proportionately using the aid of technological advancements, particularly the online platform. The curriculum produces a hybrid learning model, which has proven to increase digital literacy by 15% compared to the traditional curriculum. The hybrid TEFA model is in principle like the TEFA model, in its orientation toward the competency needed in the industry. The difference between the TEFA model and the Hybrid TEFA Model, which was popular during the COVID-19 pandemic, is that in the hybrid model, the stages include Virtual Factory Tour as well as Working Circles through online means of webinars for group meetings, teamwork, or meetings with the supervisors for guidance and support (Mourtzis et al., 2022).

Based on the review of the management, it was revealed that that TEFA learning has a positive impact on students. It helps them develop their spirit, sense of responsibility, carefulness, and togetherness, and encourages them to adopt a positive attitude in the industry. Additionally, TEFA learning helps motivate students to work hard toward achieving their learning goals and to succeed in their future careers (Haris, 2017).

According to Diwanggoro & Soenarto (2020) TEFA learning can shape the mindset of being an entrepreneur. Students who participate in TEFA learning develop their creative abilities, critical thinking, communication, and collaboration skills. As a result, they would have better opportunities to market their products through various means such as online marketing. Furthermore, teachers can use TEFA learning to cultivate students' independence, creativity, risk-taking ability, hardworking nature, and leadership skills. Unfortunately, the implementation of the Teaching Factory model in schools is said to have its own potential limitation in that it has yet to show effectiveness in motivating graduates to become job creators or starters. However, Dhani et al. (2021) reinforces the idea that TEFA could prepare students not only to be work-ready or highly motivated employees but also to become effective job creators.

CONCLUSION

TEFA learning for service products is oriented towards competency standards that align with the performance criteria required in the industry. The positive impact of TEFA learning on students includes an increase in mental readiness to be work ready and competitiveness in securing jobs. A partnership between schools and industries, therefore, offers several advantageous implications: a) the industry can recruit students at partnered schools as they open a job vacancy, b) schools can enhance their reputation by inviting industry professionals in the collaborative learning process, c) the partnership can reduce the gap between students' competency and the qualifications required by the industry. Finally, the model may contribute to reducing the numbers of unemployment rates. As also supported by recent research (Lestari & Aulia, 2018), all these findings confirm that there is a need for TEFA learning model to be implemented at schools.

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