Injurity: Interdiciplinary Journal and Humanity

Volume 4, Number 5, May 2025

e-ISSN: 2963-4113 and p-ISSN: 2963-3397

Evaluation of Teaching Factory Learning Model for Developing Students' Career Adaptability at SMK Nusantara 1 Comal

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ABSTRACT

This study aims to evaluate the teaching factory learning system and describe the effectiveness of teaching factory learning for developing students' career adaptability at SMK Nusantara 1 Comal, Mechanical Engineering Expertise Concentration. This study adopts the Stufflebeam's CIPP (context, input, process, product) evaluation model as the basic research framework. The subjects of this study were the teaching factory coordinator, teachers, and students who participated in teaching factory learning at SMK Nusantara 1 Comal. Data collection used a questionnaire, observations, document studies, and interviews. The surface validity of the instrument was carried out by expert judgment. The empirical validity and reliability of the instrument in the form of a questionnaire were calculated using the product moment correlation technique and the calculation of the Cronbach alpha coefficient sequentially. The research evaluation results show that the implementation of teaching factory learning reviewed from the CIPP evaluation model is included in the "good" category with an achievement percentage reaching 78.08%. The details of the evaluation results for each component are as follows: the context component is included in the "sufficient" category with an achievement level of 61.33%; the input component is included in the "excellent" category with an achievement level of 84.97%; the process component is included in the "good" category with an achievement level of 70.38%; and the product component (in the form of student career adaptability) is included in the "excellent" category with an achievement level of 86.06%.

Keywords: Teaching Factory, CIPP model, Career Adaptability

INTRODUCTION

The demographic bonus in Indonesia is estimated to occur in 2040, where the number of the workforce will experience a significant increase (Pradipta, Hirawan, & Ragamustari, 2021). From a geographical perspective, Indonesia is an archipelagic country that has abundant resources (Yasdin & Muksins, 2024). The demographic bonus and abundance of natural resources can only be maximized by providing a competent workforce. The great enthusiasm of the competent workforce followed by the increasing number of new vocational schools is inversely proportional to the reputation of vocational school graduates. BPS data in August 2023 showed that the open unemployment rate for vocational school graduates was still the highest compared to other levels of education, namely 8.6% (Badan Pusat Statistik, 2020). This shows that vocational school graduates are still unable to be absorbed in the business and industrial world, and the problem of low absorption has not been addressed comprehensively in the field (Dirjen Pendidikan Vokasi, 2024).

The government through the Directorate of Vocational School Development has taken various strategic steps to improve the competence of vocational school graduates. One of them is by developing a Center of Excellence Vocational School as a step to develop vocational

schools with certain expertise competencies in improving quality and performance, which is strengthened through partnerships and alignment with the business world, the industrial world, and the world of work. The effectiveness of vocational education in preparing skilled workers is due to vocational education carrying a special training pattern that aims to guide students to become graduates who are ready to work according to the needs of the business world and the industrial world (Terentyeva et al., 2018).

The selection of learning models for vocational schools needs to pay attention to the learning principles that apply in the independent curriculum. There are six main principles of learning in the independent curriculum according to the Education Standards, Curriculum, and Assessment Agency (BSKAP) (BSKAP, 2024). The six learning principles include 1) interactive; 2) inspiring; 3) fun; 4) challenging; 5) motivating students to participate actively; and 6) providing sufficient space for initiative, creativity, independence according to the talents, interests, and physical and psychological development of students (Satriyanto, 2023).

SMK Nusantara was selected as a center of excellence by the Directorate of Vocational High Schools as a pilot school for the development of certain competency learning activities. SMK center of excellence is a government program to improve the quality of vocational education to align with the needs of the world of work and the global industrial world (Indahsari, 2017). One of the learning activity programs organized by SMK Nusantara 1 Comal as a center of excellence SMK is the teaching factory learning activity for several years. However, until now there has never been an evaluation of the implementation of the teaching factory program as a whole at SMK Nusantara 1 Comal. Based on the results of initial observations, the reputation of SMK Nusantara 1 Comal graduates is also considered competent and well absorbed by the industry. In addition to working, some SMK Nusantara 1 Comal graduates also become entrepreneurs or continue their education. This shows that SMK graduates have career adaptability skills that have been formed during their studies at SMK Nusantara 1 Comal.

The process of forming students' career adaptability is carried out by SMK Nusantara 1 Comal through various school learning programs. However, until now there has never been an evaluation of the success of the school program in forming students' career adaptability. The establishment of vocational schools such as SMK is expected to be a school that produces graduates with a business spirit, competitive, ready to work, smart, and have strong life principles, and can contribute to improving local culture so that they are able to compete at the global level (Isnantyo et al., 2024).

The development of the world of education today, especially vocational education, expects continuity between the world of education (especially vocational education) and the business world or the industrial world. Various learning models are applied to adopt the work culture in the industry so that it can be applied in the world of education as training material to avoid mismatches between school learning materials and the competencies needed by the business world or the industrial world. Several vocational high schools in Indonesia are attempting to implement The Teaching Factory learning model, which is supported by all stakeholders (Salas-Pilco, Yang, & Zhang, 2022).

Teaching factory is an industry-based learning model (producing products in the form of goods or services) which is organized through collaboration between schools as well as the business world and the industrial world to produce competent graduates to meet the needs of the workforce in the business world and the industrial world (Liu, Ji, Zhang, & Gao, 2023).

Schools act as parties that organize learning activities. Industry acts as parties that contribute to the preparation of learning activity plans, users of learning products, and parties that absorb graduates as workers. Rapid technological advances have an impact on changes in various aspects of life. Changes in aspects of life include changes in the way humans carry out various activities, such as interacting, working, socializing, learning, and other activities (Savickas, 2021). Humans are required to always be able to adapt to these changes in order to survive and not be left behind. One of the useful abilities to be able to adapt to existing changes is Career Adaptability (Hartung & Savickas, 2023).

Career adaptability as a concept refers to a person's ability to cope with the dynamics of anticipated career changes as well as the dynamics of career changes that come unexpectedly without anticipation (Wang, Zhang, Wang, Miao, & Guo, 2024). Savickas' definition shows that career adaptability is the ability that is inherent in a person to deal with unexpected career changes. The career changes in question include changes in tasks that must be done; transitions or changes that occur in the world of work; changes in psychological states that occur in the workplace; and a person's career difficulties (Zhang, Huang, & Ye, 2024).

A person's career difficulties that can be handled with career adaptability include job search, job selection, and adjustment to the work environment. This study identifies a significant research gap in evaluating the effectiveness of the Teaching Factory learning model in fostering career adaptability among vocational school students, particularly at SMK Nusantara 1 Comal. While previous research has explored various learning models in vocational education, there is a lack of comprehensive evaluation on how the Teaching Factory model specifically contributes to the development of career adaptability, a crucial skill for navigating the dynamic labor market. Additionally, this study presents a novel approach by assessing the direct relationship between the implementation of the Teaching Factory model and the students' career adaptability, which has not been thoroughly explored in previous literature. By focusing on a specific vocational school and integrating industry collaboration, this research offers valuable insights into how vocational education can better align with the evolving demands of the workforce, filling an important gap in vocational education research. Another definition states career adaptability as human capital in the form of knowledge and competence acquired cumulatively through education and experience (Savickas, 2021).

Career adaptability is part of the psychosocial construct or aspect (Savickas, 2021). This means that career adaptability is a person’s mental condition (thoughts and behavior) as a result of the life conditions they experience. Mental conditions in psychosocial are not only influenced by oneself, but are also influenced by interactions with environmental conditions and the activities they undertake. Vocational education is organized with a special learning model with the aim of preparing students to be ready to work in a particular field (Triyono & Hariyanto, 2024).

Vocational education in Indonesia is organized with the aim of producing graduates who are ready to work or become entrepreneurs (Zhang et al., 2024). One of the factors that

directly influences the formation of students' entrepreneurial spirit is career adaptability (Wang et al., 2024). In addition, career adaptability possessed by students influences academic achievement in schools with the support of the implementation of appropriate learning models (Hartung & Savickas, 2023). Therefore, it is important to conduct research related to the formation of students' career adaptability with certain learning models. This study aims to evaluate the implementation of the teaching factory learning model for the development of Career Adaptability at SMK Nusantara 1 Comal.

METHOD

This research is included in the type of program evaluation research and is focused on evaluating the implementation of the teaching factory learning program. Evaluation models have a vital role in the implementation of evaluation research on programs or activities. Evaluation models are frameworks that are used to evaluate programs or activities (Stufflebeam & Zhang, 2017). The program to be evaluated in the study is the application of the teaching factory learning model in order to develop students' career adaptability (Aulia, Yaswinda, & Movitaria, 2022). This study adopts the CIPP evaluation model developed by Stufflebeam as the basic framework for the study (Stufflebeam & Zhang, 2017). Based on the CIPP evaluation model, the teaching factory learning components that are evaluated consist of four components. The four learning components that will be evaluated include: context components, input components, process components, and product components. The product component in this study focuses on students' career adaptability (Ambiyar & Muharika, 2019).

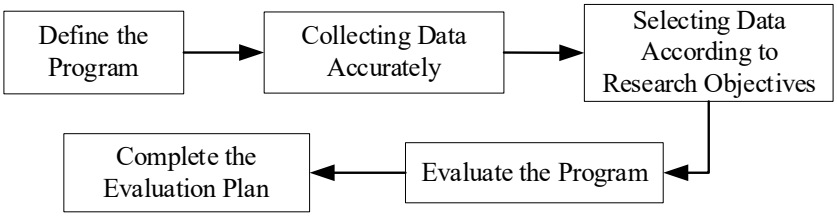

Figure 1. Research Flow Diagram.

Evaluation research on teaching factory learning was conducted at SMK Nusantara 1 Comal. The subjects who became respondents to obtain data in this study included the principal; vice principal for curriculum; teachers who act as coordinators of the school's teaching factory; teachers who teach the teaching factory learning model at school; and students who are participants in teaching factory learning activities at school. Data collection in this study uses a combination method or quantitative and qualitative data collection which is carried out sequentially (Stufflebeam & Zhang, 2017). Data collection in quantitative form is carried out with document search instruments (documentation studies), observations, and questionnaires, while qualitative data collection techniques are carried out by conducting interviews (Ambiyar & Muharika, 2019). A complete flow diagram of the research implementation sequence can be seen in Figure 1.

The context component is measured through aspects of school teaching factory policies, objectives, and curriculum. The Input component is measured by teacher readiness, teacher

competence, student readiness, and school facilities and infrastructure in organizing teaching factory. The Process component is measured through the implementation of learning, the role of teachers, and the role of students in teaching factory learning activities. The Product component is evaluated through four aspects of measuring career adaptability, i.e., concern, control, curiousity, and confidence.

Content validity of the instrument is carried out through expert judgment. The validity and reliability of the instruments construct are carried out by testing the instrument from expert review on several research samples. Construct validity is determined by calculating the Pearson product moment correlation coefficient value and construct reliability is determined by calculating the Cronbach alpha coefficient value against the results of the trial data.

This study uses a combination of data analysis techniques which are a combination of quantitative data analysis techniques and qualitative data analysis techniques. Quantitative research data obtained from documentation studies, observations, and questionnaires are analyzed using quantitative methods. Conversely, qualitative research data obtained from interviews are analyzed using qualitative methods. Research data in qualitative form is used as additional material to strengthen the facts found from quantitative research data.

RESULT AND DISCUSSION

The results of the evaluation study on all components in the implementation of teaching factory learning at SMK Nusantara 1 Comal have a success percentage of 78.08% and are included in the Good criteria. A summary of the results of data processing in the evaluation study of the implementation of teaching factory learning at SMK Nusantara 1 Comal can be seen in Table 1.

Table 1. Summary of Research Results on Evaluation of the Implementation of Teaching Factory

No	Component	Aspect	Score	Percentage	Category
1.	*Context*	Teaching Factory Policy	16	80%	Good
		Teaching Factory Purpose	7	35%	Very Lack
		Curriculum	23	65,71%	Enough
		Overall Context Aspect	**46**	**61,33%**	**Enough**
2.	*Input*	Teachers Readiness	77,67	91,38%	Very Good
		Teachers Competence	10	100 %	Very Good
		Students Readiness	48,26	87,75%	Very Good
		Facilities and infrastructure	34	68%	Good
		Overall Input Aspect	**169,93**	**84,97%**	Very Good
3.	*Process*	Implementation of Learning	19,5	65%	Enough
		Role of Teachers	41	91,11%	Very Good
		Role of Students	31	56,36%	Enough
		Overall Process Aspect	**91,5**	**70,38%**	**Good**
4.	*Product*	Concern	17,8	89%	Very Good
		Control	21,75	87%	Very Good
		Curiosity	29,21	83,46%	Very Good

	Confidence	25,92	86,4%	Very Good
	Overall Product Aspect	**94,69**	**86,06%**	**Very Good**
Overall Components		**402,12**	**78,08%**	**Good**

Context Components

The implementation of teaching factory learning at SMK Nusantara 1 Comal is reviewed from the context component, which includes several aspects such as teaching factory policy, objectives, and curriculum, all of which are categorized as sufficient with a 61.33% implementation level. The evaluation results of the teaching factory policy sub-aspects, school cooperation, and teaching factory organizational structure are in the "very good" category, with an implementation percentage of 100%. These results are strongly supported by interviews revealing that the organizational structure in the implementation of the teaching factory at SMKS Nusantara 1 Comal is well-structured, with clear job descriptions for each element of the teaching factory implementation structure. The teaching factory implementation policy at SMK Nusantara 1 Comal aligns with the opinion that the organizational structure must have a formal nature, formalized by the Principal's decree, and equipped with detailed job descriptions (Stufflebeam & Zhang, 2017).

The results of the analysis of the teaching factory SOP sub-aspect showed a 20% implementation level, which places it in the "very lacking" category. Interviews revealed that there is no clearly structured and neatly organized SOP for implementing the teaching factory. This outcome does not align with the opinion that a teaching factory program must have a clearly structured workflow and be carried out consistently according to the planned workflow (Stufflebeam & Zhang, 2017). Based on this opinion, it is necessary to design and implement clearer SOPs for teaching factory implementation. The evaluation of teaching factory learning objectives showed a 35% implementation level, categorized as "very lacking." This aligns with the interview results, which revealed that the objectives of the teaching factory were not clearly stated, implying that SMK needs to formulate and determine clearer objectives. Evaluation of the sub-aspects of the work plan/program achieved the highest implementation level and was categorized as good. Other aspects, such as short-term objectives, long-term objectives, and achievement matrix, all showed a 20% implementation level, categorized as "less." These results indicate that no sub-aspect of the teaching factory objectives had a maximum implementation level, which is inconsistent with the provisions of the Directorate of Vocational High School Education, which states that the teaching factory must have clear objectives for both students and teachers (Wahjusaputri & Bunyamin, 2022).

The analysis of the teaching factory curriculum aspects showed a "sufficient" category with a 67.71% implementation level, concluding that the school's teaching factory curriculum needs improvement. The sub-aspects that reached 100% implementation were the worksheet and teaching module sub-aspects. The block schedule sub-aspect showed minimum achievement. The analysis revealed that the job sheet and teaching module sub-aspects were categorized as "very good," with an implementation level of 100%. Based on these results, it can be concluded that the worksheets and teaching modules developed by the school are complete and aligned with the teaching factory learning objectives. These results are reinforced by interviews, which indicated that the preparation of teaching modules starts with an analysis

of Learning Achievements and Learning Objective Flow, prepared by teachers each new school year. The preparation of modules and worksheets is also adjusted to the facilities, infrastructure, and products produced in teaching factory learning. This aligns with the opinion that teaching devices are formulated at the beginning of each new school year and made by the relevant subject teachers (Indahsari, 2017). The creation of teaching modules can be done independently by teachers or in groups, considering the availability of facilities, infrastructure, and budgeted costs.

Input Components

Evaluation of the implementation of teaching factory learning activities at SMK Nusantara 1 Comal, reviewed from the input component, consists of several aspects, including teacher readiness as a teacher in teaching factory learning; teacher competence for teaching factory learning; student readiness to participate in teaching factory learning; and supporting facilities and infrastructure for teaching factory. The input component, as a whole, has a percentage of implementation level of 84.97%, placing it in the "very good" category. Teachers are a critical element in teaching factory learning (Indahsari, 2017). In this study, teacher readiness was measured in terms of teachers' knowledge regarding their roles and tasks in the teaching factory. Teachers in the teaching factory have roles in both educational and production contexts, with all aspects of achievement in these contexts falling in the "very good" category. Teacher readiness in the educational context achieved 92.73%, while the production context reached 88.90%.

The next important aspect in implementing teaching factory learning is teacher competence. The competence (skill) of teachers was evaluated by examining the competency test certificates held by the teachers, as well as their experience in participating in industrial internships to learn about the production process. After analyzing teacher competence, it was found that overall, teacher competence at SMK Nusantara 1 Comal was in the "very good" category, with a maximum implementation rate percentage of 100%. The readiness of students to participate in teaching factory learning was also evaluated. The results showed that the student readiness aspect received a "very good" evaluation with a readiness level of 87.27%. Therefore, it can be concluded that SMK Nusantara 1 Comal students are well-prepared to engage in teaching factory learning.

The supporting facilities and infrastructure for teaching factory learning activities were specifically focused on the laboratory or workshop where teaching factory learning takes place at SMK Nusantara 1 Comal. Several sub-aspects of the laboratory or workshop that were evaluated include: availability of practical equipment, governance of the use of practical equipment, MRC (Maintenance, Repair, and Calibration) management, workshop layout, and implementation of OHS (Occupational Health and Safety) procedures in the workshop (Wijanarka et al., 2023). The analysis revealed that the supporting facilities and infrastructure for teaching factory learning activities at SMK Nusantara 1 Comal were rated as "good," with an achievement percentage of 68%. These results were corroborated by interviews, which revealed a lack of MRC management and insufficient implementation of OHS procedures in the workshop. Therefore, improvements are necessary in several sub-aspects, such as workshop layout, MRC management, OHS signage in the workshop, and the overall implementation of OHS procedures in the workshop, which is where teaching factory learning takes place.

Process Components

The process components in the implementation of teaching factory learning activities include several aspects: implementing teaching and learning activities with the teaching factory, the role of teachers in teaching factory learning, and the role of students in teaching factory learning. Overall, these components were rated as "good," with a percentage of implementation level reaching 70.38%. The implementation of teaching factory learning activities is based on the conditions of the industrial world and the business world. The flow of teaching factory learning implementation can be assessed from sub-aspects such as teaching modules, worksheets, practice materials, practice bases, training implementation, entrepreneurship, and teaching factory learning activities (Satriyanto, 2023). Based on the analysis, it was revealed that the implementation of teaching factory learning was categorized as "sufficient," with a percentage of achievement level of 65%. The observation results showed that the learning process was not fully aligned with the teaching module as a learning guide. The teaching factory learning implementation emphasized practical activities that provide meaningful experiences directly to students and produce products according to consumer needs. The analysis also indicated that teaching factory learning, as an industry-based learning concept, can only be implemented successfully through synergy between schools and industry partners to produce competent graduates (Wahjusaputri & Bunyamin, 2022).

The teacher's role in implementing teaching factory learning was also evaluated from the education and production contexts. Based on the analysis, the teacher's role was categorized as "Very Good" with an implementation level of 91.11%. The success of the teacher aspect was supported by interview results, which revealed that, in the education context, teachers prepare learning administration tools, educate, teach, give advice, guide, and provide direction. In the production context, teachers supervise and assess student work. These results align with the Directorate of Vocational High School Learning guidelines, which state that teachers act as educators, instructors, mentors, and examiners in education, and as implementers, companions, and examiners in production (Wijanarka et al., 2023). Regarding students, the analysis showed that their role during teaching factory learning activities was rated as "sufficient" with a percentage of achievement level of 53.36%. Observations revealed that not all students paid attention to the material presented by the teacher, and their activities in the production process (practice) did not fully follow the worksheet procedures. Interviews also indicated that students' active participation in asking questions or consulting with teachers about practicum procedures was not optimal. This condition does not fully align with the teaching factory learning guidelines issued by the Vocational Education Directorate, which aims for students to actively participate in both education and production activities (Wijarwanto et al., 2023).

Product Components

The product component evaluated in this study was the development of students' career adaptability after participating in teaching factory learning. Career adaptability should be well honed in students during teaching factory learning activities. The evaluation of the development of students' career adaptability was carried out in four aspects: attention, control, curiosity, and student self-confidence. The results of the evaluation of the components of students' career adaptability as a whole fell into the "very good" criteria, with a percentage of

achievement reaching 86.06%. All aspects of career adaptability fell into the "very good" category, with the highest level of achievement being 89% in the aspect of attention. The indicator with the lowest level of achievement was curiosity, at 83.46%. The high percentage of career adaptability in each aspect indicates that these four aspects can already show a good level of students' career adaptability (Savickas, 2021).

CONCLUSION

The results of the evaluation of the implementation of teaching factory learning at SMK Nusantara 1 Comal when viewed from the overall CIPP evaluation components at SMK Nusantara 1 Comal obtained a percentage of achievement score of 78.08% and was included in the "good" category. The percentage of the level of achievement of the evaluation results of the context component reached 61.33% and was included in the "Enough" category. The percentage of the evaluation score of the teaching factory learning input component at SMK Nusantara 1 Comal as a whole was 84.97% and was included in the "Very Good" category. The results of the evaluation of the teaching factory implementation process component at SMK Nusantara 1 Comal obtained a percentage of achievement score of 70.38% and was included in the "Good" category. The results of the evaluation of the implementation of teaching factory learning at SMK Nusantara 1 Comal for the product component or development of student career adaptability were included in the "Very Good" category with a percentage of achievement level of 86.47%. All aspects of the product component or career adaptability were included in the "Very Good" category with a percentage of achievement level of 89% for the attention aspect; 87.02% for the self-control aspect; 83.46% for the curiosity aspect; and 86.41% for the self-confidence aspect.

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