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Learning Management Model Through Teaching Factory: Implementation Strategies and Challenges

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Abstract

This study aims to determine the strategies and implementation challenges of learning management using the Teaching Factory model. The subjects in this research are students of vocational programs at Airlangga University (UNAIR) that serves as a comparative study for vocational program students at Jenderal Soedirman University (UNSOED). This study used a sample of 5 study programs. The approach used in this research is a case study-based qualitative approach. The findings of this research are: (1) the implementation of teaching factory in UNAIR involves several stakeholders such as students, lecturers, course coordinators in vocational programs and the World of Business and Industry; (2) the teaching factory-based learning approach can only be implemented in certain courses, not as a whole; (3) the place and service is at Airlangga Wellness Center/ AWC; (4) the strategy of offering teaching factory services is to establish it in a strategic location; (5) challenges in the implementation of teaching factory are faced by lecturers and students of vocational programs; and (6) the implementation of teaching factory has theoretical and practical benefits. This study limited in vocational programs at UNAIR and UNSOED. The future research could focus comparing the effectiveness of Teaching Factory in different vocational fields of study, such as engineering, design, and tourism in different universities.

How to Cite

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INTRODUCTION

In a globalized world, it is difficult to resist the use of technology in the production process. The adoption of better technology should be a means to achieve a higher level of development. It is inevitable that with new technologies, machines will replace humans in carrying out certain tasks in a production process. The use of such technology in the short term may cause disruptions in the labor market including job losses. The international labor market is currently experiencing the gig economy phenomenon where generally institutions or companies prefer to retain workers or recruit independent workers or short-term contracts only (ILO 2020).

Companies in France even prefer to keep employees in their company by providing training rather than having to recruit new employees (Cahuc and Jeremy 2023). In the United States there are more than 57 million freelancers (McCue 2018), while the number of freelancers in Indonesia is also quite high, reaching 5.89 million people (BPS, 2019). The rise of the gig economy phenomenon has made it necessary to review the labor governance system (BBC 2017). The development of the telecommunications world and the use of crowdsourcing also exacerbate this condition, because it can encourage a number of business sectors not to require many permanent employees (Arviana 2021).

Indonesia has also seen rapid technological developments in online platforms that create opportunities for e-commerce, on-demand services and transportation, but the poor state of physical infrastructure, especially outside Java and Bali, and low investment in research and development, mean that Indonesia faces considerable challenges. In terms of technological readiness, Indonesia is positioned very low on the Global Competitiveness Index (GCI), ranking 80th overall (ILO 2020). In addition, in 2022 Indonesia only has a Human Development Index (HDI) of 0.750 which is ranked 114th out of 191 countries. The low quality of Indonesia's Human

Resources (HR) also makes the workforce less competent.

Unemployed human resources due to low skills are a pressing problem in various countries, especially in Europe (Cahuc and Jeremy 2023). Unemployment of productive age also causes poverty problems in developing countries such as Indonesia (Utami 2018). This shows that age, education level and competence affect the number and productivity of workers. Based on the unemployment rankings of ASEAN member countries, Indonesia is ranked 3rd highest, after Brunei Darussalam and the Philippines, as more and more companies in Southeast Asia plan to upgrade their technology. This is further compounded by the International Labor Organization or ILO (2020) forecast that more than 60 percent of Indonesia's salaried jobs are under threat. Employment will become increasingly polarized, with a concentration of very high-skilled and low-skilled jobs. Jobs that involve repetitive functions that can be turned into algorithms or learned by machines will become obsolete.

Indonesia's labor market is also still dominated by elementary school graduates and below (no/never been to school/not yet graduated from elementary school), at 39.76 percent. Meanwhile, the working population of Diploma I/II/III and Diploma IV, S1, S2, S3 graduates amounted to 11.51 percent. In addition, the Open Unemployment Rate (TPT) for SMK graduates is the highest compared to other education level graduates at 9.31 percent.

Indonesia still underutilizes its vocational graduates compared to other countries. There is a wage differential between vocational and general education graduates, with vocational education graduates from 2017-2022 earning higher wages than general education graduates, so vocational education plays a role in increasing long-term income and the number of technically skilled workers in the Thai labor market (Wongmonta 2023). In Egypt, male general education graduates also do not earn higher wages than vocational education graduates (Kemper and Renold 2024), so it is

important for Indonesia to improve the competency of its vocational education graduates in order to compete in the labor market. Therefore, the government issued Presidential Regulation No. 68 Year 2022 on Revitalization of Vocational Education and Training.

Table 1. Unemployment Rate by Education Level

Education level	Open Unemployment Rate by Education Level		
	2021	2022	2023
Never attended school/not yet graduated & completed elementary school	3.61	3.59	2.56
Junior high school	6.45	5.95	4.78
Senior high school	9.09	8.57	8.15
Vocational senior high school	11.13	9.42	9.31
Diploma I/II/II	5.87	4.59	4.79
University	5.98	4.80	5.18

Source: (BPS, 2023)

The revitalization of vocational education is expected to improve the quality of prospective workers and reduce the problem of unemployment of productive age (Wijanarka, Wijarwanto, and Mbakwa 2023). The revitalization of vocational education also serves to transform the paradigm of vocational education from supply-oriented to demand-oriented, so that vocational education graduates are truly able to answer the needs of the world of work and society (Mendikbudristek 2023). In producing competent graduates in accordance with market needs, a means of liaison is needed for cooperation between education units and the industrial world (Directorate of PSMK 2015). The synergy of education units with business and industry (DUDI) can be organized through a product and service-based learning model or often called the teaching factory concept.

Learning management is very important to improve the effectiveness of the teaching and learning process (Saifulloh & Darwis, 2020). In line with this, learning management also determines the success of the learning model applied by each school (Yahya, 2013). So that, management at the university level as an educational institution also needs to be considered. According to (Sitti et al., 2023), learning management indicators include: (1) transparency; (2) participation; (3) accountability; (4) coordination; (5) responsibility; (6) independence; (7) equality; and (8) fairness.

Teaching factory as one of the learning management is a modification of the production unit model or school-based enterprise, where students learn through the process of producing goods or services in collaboration with industry (DUDI).

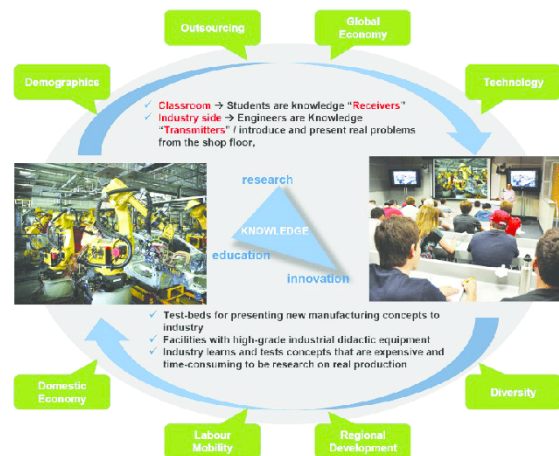


Figure 1. Teaching Factory Scheme

Source: (Chryssolouris et al., 2016)

The implementation of teaching factory in education units can reduce the competency gap between the knowledge provided in schools and industry needs (Suranto et al. 2022). The teaching factory program is a combination of competency-based training (CBT) and production-based training (PBT). Through teaching factory, students will not only practice skills in learning, but students also learn to work in groups, learn to communicate with others, and prepare to entering the world of work (Rohmah et al., 2019).

This study in the field of vocational learning is very important to improve the quality of education and student skills that are relevant to industry needs. Teaching factory is one of the learning management. According to Ardianto et al. (2017), Teaching Factory can bridge the gap between the theory learned at school and the practices needed in the industrial world, thus preparing graduates who are more work-ready (student employability). Sudarsono (2019) states that the implementation of Teaching Factory not only provides practical skills to students, but also improves the quality of learning by creating more realistic and applicable conditions in the vocational education environment. Widiastuti and Setyawan (2020) showed that students who were involved in the Teaching Factory program had higher competencies compared to those who only studied theory. Zulfa et al. (2021) identified several challenges in the implementation of Teaching Factory, such as limited facilities and trained human resources, as well as a lack of coordination between schools and industries.

The development of teaching factory needs to involve the government, local government and stakeholders in making regulations, planning, implementation and evaluation in order to produce prospective workers who have soft skills and hard skills with the ability to think critically and skills in solving problems to face the world of work in the era of globalization (Winangun 2017).

This study aims to determine the strategies and implementation challenges regarding the governance of learning management using the Teaching Factory model carried out by lecturers in accordance with the courses taught in vocational programs at Jenderal Soedirman University (UNSOED).

METHODS

The subjects in this research are students of vocational programs at Airlangga University (UNAIR) that serves as a comparative study for vocational program students at

Universitas Jenderal Soedirman (UNSOED). Comparative Study is a type of research that aims to find out and or test the difference between two or more research objects (Perdana & Utami, 2022). This study used a sample of 5 study programs. The research subject presented in Table 2.

Table 2. Research Sample

Department	Study Program
Healthcare	1. D4 Traditional Medicine
	2. D4 Physiotherapy
	3. D4 Radiologic Imaging Technology
	4. D4 Medical Laboratory Technology
Business	5. D4 Digital Office Management

Source: <https://vokasi.unair.ac.id/> (2024)

The approach used in this research is a case study-based qualitative approach. According to Creswell (1998) a case study is a study in which the researcher explores a particular phenomenon in a time and activity, and collects detailed and in-depth information using various data collection procedures over a certain period. The case study method is widely applied to higher education research and practice focusing on learning management (Rosier, 2022).

This research will be conducted using several techniques, such as:

1. Interview

Interview is a data collection technique when researchers want to know things from respondents in more depth (Sugiyono 2021). In this study, interviews will be conducted with teaching staff, managers, administrators, and vocational program students to gain insight into the implementation, learning process, challenges faced, and perceived benefits of the teaching factory concept.

2. Observation

Observation is an activity using the five senses to obtain the information needed to answer the research problem being studied.

According to Sugiyono (2021) observation in terms of implementation can be divided into two types. There are participant observation and non-participant observation. In this research, direct observation will be made of the learning process in the Teaching Factory, including interactions between students/participants and teachers, monitoring the production or simulation process, and overall management.

3. Documentation

Documentation can be a medium for obtaining information through facts stored in the form of letters, diaries, archives, photographs, meeting results, souvenirs, activity journals, and so on. Farida (2014) suggests that document content review is a data collection technique by utilizing archives, notes, photos, films, and other documentation in research. In this study, related documents such as curriculum, lesson plans, progress reports, and performance evaluations of vocational program students who take part in teaching factory learning will be analyzed.

The validity test in this study was conducted using triangulation and peer debriefing methods. Triangulation refers to the use of various data sources, methods, theories, or researchers to verify research results, where researchers in this study use interviews, observations, and documentation as different data sources to ensure consistency of results (Creswell & Poth, 2018). The Peer Debriefing method is used by discussing with peers who have experience or expertise in the same field to evaluate findings, provide different perspectives, and correct or correct errors in data interpretation. Guba and Lincoln (1989) emphasize the importance of the role of peers in enhancing the validity and credibility of research findings.

This study uses data analysis according to Creswell (2014) including: (1) Providing raw data in the form of transcripts, field notes, and researchers' own views; (2) Organizing the data to be analyzed; (3) Reading all data; (4) Coding; (5) Arranging data descriptions; (6) Constructing data; (7) Interpreting the data

description that has been arranged. The Coding process through the researcher identified and categorized the data based on key aspects relevant to the research, then constructing the data with compared the findings between the two universities to generate a better understanding of the effectiveness and challenges of the Teaching Factory model.

RESULTS AND DISCUSSION

The Place and Service of Teaching Factory at UNAIR is at Airlangga Wellness Center (AWC)

UNAIR has a teaching factory-based learning center, namely Airlangga Wellness Center (AWC). Where is located in Jalan Dharmawangsa Dalam Selatan Number 28–30, Surabaya, East Java. The location of AWC is very strategic as it is in the center of Surabaya, easily accessible, and close to various public facilities. Suhendri and Setiawan (2020) explained that with the strategic location of the teaching factory, students can have a more varied experience and allow students to practice the skills learned in a context that is more applicable and relevant to market needs, due to the large number of service users who come. With many service users coming to the Teaching Factory, students can learn about the communication, teamwork, and professional ethics in the world of work. These skills are important to enhance the competitiveness of graduates on the job market (Purnama & Yuliana, 2021).

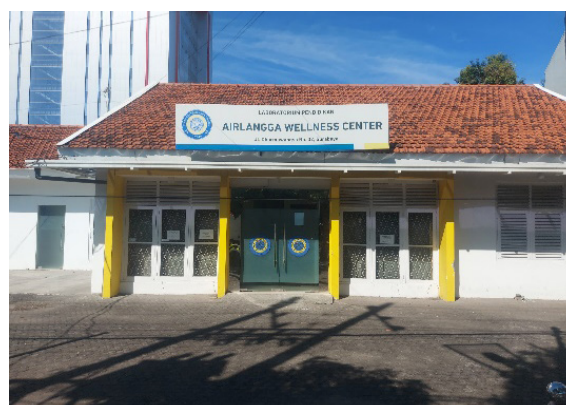


Figure 2. Airlangga Wellness Center

The services at AWC are customer service, massage and acupuncture, physiotherapy treatment, clinic, health laboratory, and radiology. Customer service at AWC is carried out by D3 Digital Office Management study program students. Massage and acupuncture services are performed by D4 Traditional Medicine students. Physiotherapy is performed by D4 Physiotherapy students. Health and radiology laboratories are carried out by D4 students of Radiology Imaging Technology. Haris et al. (2020) showed that with various types of services and projects, students have the opportunity to develop technical and managerial skills in more complex situations.

Table 3. Vocational Programs of Jenderal Soedirman University

Department	Study Program
Agriculture	1. D3 Agribusiness
	2. D3 Land Resources Planning
Biology	3. D3 Fish Cultivation
Economy and Business	4. D3 Business Administration
	5. D3 Office Administration
	6. D3 Accounting
	7. D3 International Business
Animal Husbandry	8. Cattle Cultivation
Cultural Science	9. D3 Mandarin Language
	10. D3 English Language

Source: (Admission Jenderal Soedirman University, 2024)

All vocational study programs in UN-SOED do not yet have teaching factory facilities as a center for industry-based learning. However, the faculty of economics and business as a faculty with 3 vocational study programs has facilities in the form of an integrated lab that has various services such as an export-import lab, tax center, investment

gallery, banking lab, office lab, accounting lab, and computer lab which can be used as a means of student learning.

According to Widiastuti and Setiawan (2020), universities that implement Teaching Factory show an improvement in the quality of their learning so that universities usually get higher accreditation scores because they are able to demonstrate closer links with industry needs and curriculum relevance to labor market developments. Santoso (2018) suggests that Teaching Factories that are directly connected to the industrial world recognize the higher quality of graduates. This shows that universities that implement this model do not only focus on educational theory, but also on developing practical skills that the industry wants.

The Implementation of Teaching Factory in UNAIR Involves Several Stakeholders

The stakeholders involved in the implementation of teaching factory in UNAIR vocational programs are students, lecturers, course coordinators in vocational programs and the World of Business and Industry such as PT. Telekomunikasi Selular (Telkomsel) and PT. Astra International. Meanwhile, Jenderal Soedirman University will attempt to implement teaching factory-based learning for its vocational program students.

UNAIR working with PT Telkomsel for excellent service courses in the D4 Digital Office Management program. The form of cooperation is the supply of digital modules as student learning materials. In addition, UNAIR has also collaborated with PT Astra International as a teaching factory practice location and practiced Astra's Big Data project for Marketing Call courses.

This result in line with Zulfa (2021) that is the engagement of stakeholders helps in designing industry-based curriculum, providing internship sites, and supporting the necessary practical education facilities. As a result, students gain more hands-on experience and are better prepared to enter the professional world.

The Teaching Factory-Based Learning Approach at UNAIR Can Only be Implemented in Certain Courses, Not As A Whole.

The D4 Traditional Medicine (Batra) Study Program is a vocational education program that develops complementary medicine comprehensively in the fields of physical and herbal interventions. Students of the D4 Traditional Medicine Study Program are facilitated with the Battra Clinic which is a practice room for Battra students to implement various kinds of massages, such as Javanese, Balinese, and so on. The Battra Clinic is equipped with massage beds, bed sheets, pillows, maniquen anatomy of the human body, and some practice equipment. In the D4 Traditional Medicine program there is a traditional medicine technique course that uses teaching factory facilities in the form of massage and acupuncture service practices. The D4 Physiotherapy program practices physiotherapy treatment courses using tools in the form of bicycle machines in Airlangga Wellness Center (AWC) for physiotherapy exercises. This finding in line with Mulia & Setiawan (2020) that is the teaching factory model provides students with practical skills that are urgently needed in the growing traditional medicine industry.

The D4 Radiology Imaging Technology study program of the Faculty of Vocational Studies has advantage in optimizing medical images and interventional radiography. This study program has facilities:

1. Lab. Radiology Learning Center (completed with PACS system & 3D Workstation)
2. Lab. USG
3. Lab. Radiography
4. Lab. Radiophotography
5. Imaging instrumentation, imaging physics and QA lab
6. Lab. Clinical CT-Scan
7. Lab. Clinical MRI Lab
8. Lab. Clinical Interventional Radiography

The D4 Radiology Imaging Technology program uses the radiology laboratory for radiology courses. D4 Medical Laboratory Technology students use X-Ray for medical

records and health information courses. According to Haris & Kuniawan (2021) The application of Teaching Factory in radiology increases students' readiness to work in hospitals or clinics after graduation.

D4 Digital Office Management is one of the study programs under the Faculty of Vocational Business Department. This study program is a development of the D3 Office Management study program. D4 Digital Office Management is a very interesting study program with broad job opportunities. Currently, many of the graduates are absorbed in the workforce before graduation. This is because the needs of institutions or companies for administrative staff are always available. In addition to being administrators in various institutions, graduates are also equipped with entrepreneurial skills and an understanding of offices that make graduates have the ability to become entrepreneurs. In the D4 Digital Office Management program for the Prima Service course is practiced by becoming a customer service and for the Computer Application course in the Computer Laboratory provides typing, data input, and layout services. In line with Prasetyo & Sulisty (2020) which states that the application of Teaching Factory in office courses in vocational education, which includes various aspects of office administration, such as document management, business communication, and the use of office software. According to Widiastuti & Setiawan (2020) where the Teaching Factory model is not only applied in engineering, but also in various other study programs such as health, graphic design, office management, and electronics.

The Strategy of Offering Teaching Factory Services at UNAIR is to Establish it in a Strategic Location

The service offering strategy carried out by AWC UNAIR is to build AWC in a strategic location. This is done to increase optimal income. In addition, UNAIR also actively establishes MoU with DUDI which are bridged by the Study Program Coordinator. The strategy used in the implementation of learning

with theory-practice division. For theoretical learning using Cased-Based Learning (CBL) through digital modules from the MoU with Telkomsel, while for practical learning using Project-Based Learning (PjBL) from the MoU with Astra.

Challenges in the Implementation of Teaching Factory are Faced by Lecturers and Students of Vocational Programs at UNAIR

The challenges faced in terms of lecturers in UNAIR are as managers of teaching factory facilities who still have to implement the Tri dharma of Higher Education, so that teaching factory learning centers should be managed by professional managers. This finding in line with Widiastuti & Setiawan (2020) that lecturers need special training to prepare students to face the changing dynamics of the industry in implementing the teaching factory method.

The challenge in terms of students is the level of discipline if they are getting a Project Based Learning-Teaching factory schedule or when students are called to DUDI partner companies. according to Zulfa & Hidayati (2021) Students face challenges in balancing academic tasks with the practical experience they gain in industry.

There are also challenges in terms of cooperation with DUDI in terms of long bureaucratic procedures. In UNAIR, the MoU process is carried out by the Employment Agreement Commission and the Coordinator of the Study Program, then coordinated to the Lecturer, and then practiced by the lecturer of the course. Industry sometimes does not have enough time or resources to engage students in actual projects that can develop their skills. Thus, there needs to be stronger cooperation between education and industry, as well as improving supporting facilities and infrastructure (Zulfa & Hidayati, 2021).

The Implementation of Teaching Factory Has Theoretical and Practical Benefits

The theoretical benefit of teaching factory facilities at UNAIR is that students get a

place to practice learning, while the practical benefit is that significant income is obtained, but this can only be generated by teaching factory services for vocational study programs in the health department such as massage and acupuncture services, clinics, health laboratories, physiotherapy equipment, and radiology laboratories.

CONCLUSION

The Teaching Factory concept is a modification of the production unit model or school-based enterprise, where students learn through the process of producing goods or services in collaboration with industry. The teaching factory program is a combination of existing learning, namely Competency-Based Training (CBT) and Production-Based Training (PBT). In Indonesia, the concept of teaching factory is still rarely applied at the university level, but there are several higher education institutions that have begun to develop the concept of teaching factory in their learning, such as the implementation of teaching factory in the Vocational Program of Universitas Airlangga who has Airlangga Wellness Center (AWC), including programs in the Health and Business department. Meanwhile, Jenderal Soedirman University will attempt to implement teaching factory-based learning for its vocational program students especially in faculty economy and business who has integrated laboratorium with many facilities for their vocational program students.

The strategy implemented in AWC UNAIR is to establish a teaching factory center in the university environment with various scientific fields, in a strategic place so that it can become a practical tool for students and generate income. The challenges faced are high operational costs and failure of teaching factory management because the managers are lecturers who have an obligation to fulfill the Tri dharma of Higher Education so it is better to recruit professionals who are experts in management.

The recommendations for the University and Faculty can provide an appropriate teaching factory center as a place for practice or project-based learning by paying attention to consumer needs around the Jenderal Soedirman University's environment and being able to establish networks using DUDI-based MoU. Universities need to collaborate more closely in the form of internships, training programs, and research collaboration between universities and companies or industrial institutions. In addition, the University can modify courses to make them more applicable and provide more opportunities for students to interact directly with the industrial world, through industrial simulations or company-sponsored projects.

The research team hopes that further research activities in the future can examine in more depth to increase the potential for implementing teaching factories in vocational programs at Jenderal Soedirman University. Further research could focus on the direct impact of Teaching Factory on students' employability after they graduate, exploring how much improvement in practical skills is experienced by students involved in Teaching Factory, both in terms of technical skills and soft skills such as communication and collaboration, or comparing the effectiveness of Teaching Factory in different vocational fields of study, such as engineering, design, and tourism.

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