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Teaching Factory Readiness in Vocational High Schools

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***Abstract*—This study aims to determine the readiness to implement teaching factory learning in the Modeling Design and Building Information Vocational Program at SMK Negeri 2 Ciamis Indonesia. This study uses a descriptive research method with a quantitative approach. The level of readiness is seen from four aspects: the readiness of the teacher aspect, the preparedness of the industrial cooperation aspect, the readiness of the facilities and infrastructure aspect, and the readiness of the school management aspect. The data was collected by distributing questionnaires, observations, and documentation involving the Principal, vice-principal of the curriculum, head of the building information design and modeling study program, and study program teachers. The study results found that: (1) The teacher aspect with four indicators is ready by 63,82% on apply teaching factory learning. (2) The industrial cooperation aspect with two indicators is ready by 72,57% on apply teaching factory learning. (3) The facilities dan infrastructure aspect with six indicators is very ready by 72,57% on apply teaching factory learning. (4) The school management aspect with five indicators is quite ready by 45,56% on apply teaching factory learning.**

Keywords—readiness, teaching factory, modeling design and building information, SMKN 2 Ciamis

I. INTRODUCTION

To encourage vocational high schools (SMK) to create graduates who are ready to face the challenges of industry 4.0, the Government, through the PSMK Directorate, has made a Vocational High School Revitalization program as stated in Presidential Instruction No. 9 of 2016 concerning Vocational High School Revitalization. Through this program, the Government focuses on solving vocational problems related to future workforce graduates. They are easily absorbed in the business world and the industrial world (DU/DI). One form of vocational revitalization is teaching factory learning innovation [1].

In the Director General's regulation [2], the teaching factory is an industry-based learning concept in which it produces products and services by adopting the actual work atmosphere. The teaching factory learning model (TEFA) is a learning model that combines the CBT (Competency-Based Training) learning model and the PBT (Production Based Training) learning model [3].

Teaching factory learning aims to overcome the gap between the competencies taught by schools and the competencies required in the industry. Students can maximize their skills through the teaching factory learning model by producing goods and services according to their respective expertise programs [4].

The teaching factory learning program at SMK Negeri 2 Ciamis has not been implemented in all skill programs, including the Modeling Design and Building Information skills program, which is still in the planning stage. The stage is still at the planning level because there are still several obstacles in realizing the implementation of the teaching factory learning program. Therefore, in order to achieve maximum goals, careful preparation is needed in the planning process.

The level of readiness in carrying out a program needs to be considered to measure the things that support and hinder the implementation of something. Balir and Ravel says that readiness is an essential aspect for an institution in implementing a new program or policy; therefore, everything needs to be known in advance of the level of readiness to reduce errors that will result in losses both time and financially [5].

At the planning stage of teaching factory learning, there are several aspects that need to be prepared in order to achieve maximum goals. The PSMK Directorate [6] in the Teaching Factory Implementation Guidebook suggests a teaching factory learning planning strategy which consists of four aspects, namely: (1) strategic partnership with industrial world; (2) Arrangement of Facilities and Infrastructure; (3) Human resource development; (4) School management.

Thus, this research aims to study further about the readiness of SMKN 2 Ciamis in organizing a teaching factory program. The research questions are specific to the Building Modeling and Information Design expertise program that involves various stakeholders, with a focus on the Teaching Factory planning standards provided by the PSMK Directorate. The research will focus on the following research questions: How is the readiness of SMKN 2 Ciamis in facing the implementation of the teaching factory program seen from the preparedness of teachers, industrial cooperation, the readiness of facilities, and readiness of school management?

II. METHODS

The method used is descriptive research with a quantitative analysis approach. The study was conducted at SMK Negeri 2 Ciamis. The population used is the Principal of SMKN 2 Ciamis, the Vice-Principal for Curriculum, the Modeling Design and Building Information Vocational Program Head, and seven productive teachers in that vocational program.

Data were collected using questionnaires, observations, interviews, and documentation. Two analytical scales were used on the questionnaire instrument, namely the Likert scale with five alternative answers and the Guttman scale with Yes-No alternative answers. While for the observation instrument using a rating-scale with a scale of 1-4. The data analysis technique used was the descriptive statistics with the percentage method (Table I).

TABLE I. DESCRIPTIVE DATA CATEGORIES

Range	Category
81 % - 100 %	very well prepared
61% - 80%	Prepared
41% - 60%	Quite prepared
21% - 40%	Less Prepared
1% - 20%	Not prepared

Source: research results, 2021.

The level of readiness is seen from four aspects: the readiness of the teacher aspect, the preparedness of the industrial cooperation aspect, the readiness of the facilities and infrastructure aspect, and the readiness of the school management aspect.

III. RESULTS AND DISCUSSION

A. The Readiness of the Teacher Aspect

Based on the results of the study, the following are the results of the readiness of the teacher aspect seen from four indicators:

TABLE II. THE TEACHERS' READINESS ASPECT

No	Indicator	Score	(%)	Category
1	Teacher Qualifications	18	64,29%	Prepared
2	Teacher Quantity	1	33,33%	Less Prepared
3	Teacher Competence	355	84,52%	very well prepared
4	Teaching Materials	384	73,14%	Prepared

Source: research results, 2021.

Based on table II, the teacher qualification indicators are in the "Prepared" category with 64.29%; the teacher quantity indicator is in the "less prepared" category with 33.33%, the teacher competency indicators are in the "very well prepared" category with 84.52%. In comparison, the teaching materials indicators are categorized as "Prepared" with 73.14%.

TABLE III. TEACHER ASPECT READINESS

Respondents	Point	Score	(%)	Category
7	34	757	64%	Prepared

Source: research results, 2021.

Based on Table III, each indicator's accumulated results show that the teacher's readiness in implementing the teaching factory in the Modeling design and building information vocational program at SMKN 2 Ciamis is in the "Prepared" category with an accumulative percentage of 63.82%.

The result shows the teacher aspect has been declared ready to support the implementation of the teaching factory program at SMKN 2 Ciamis. It is known that the teacher plays a crucial role in determining the success of learning. The teacher is a component that plays a role in the formation of students in the teaching and learning process [7]. The teacher will be a benchmark for the success of achieving student competence. In teaching factory learning, the teacher must have the qualifications, competence, and ability to process learning based on the teaching factory learning objectives [8].

B. The Readiness of the Industrial Cooperation Aspect

Table IV shows the results of research on the readiness of the industrial cooperation aspect with two indicators:

TABLE IV. PERCENTAGE OF THE INDUSTRIAL COOPERATION READINESS ASPECTS

No	Indicator	Score	(%)	Category
1	Aligment with the world of work	134	76,57%	Prepared
2	Form of Cooperation	72	68,57%	Prepared
Total		206	72,57%	Prepared

Source: research results, 2021.

Based on Table IV, the readiness of the industrial cooperation aspect, the indicator of alignment with the world of work is included in the "Prepared" Category with a score of 134 and a percentage of 76.57%. In comparison, the indicators of the form of cooperation are also included in the "Prepared" category with a score of 72 and the percentage 68.57%. Thus, the industrial cooperation aspect's accumulated readiness is in the "Prepared" category with an overall score of 206 with an average rate of 72.57%.

Teaching factory learning in the implementation process requires a link and match between learning in schools and the needs of the business world and the industrial world. Hence, there is a need for collaboration between schools and the industry to run the teaching factory learning concept according to its objectives [7]. The cooperation between the world of work and the school will support the achievement of ideal conditions from the implementation of teaching factory learning. Industrial cooperation is crucial due to the reasons as follow: 1) creating a culture of the industrial world in schools; 2) standardizing technology and knowledge; 3) industry-

standard project work, and 4) a forum for investment from the industrial world [8].

C. The Readiness of the Facilities and Infrastructure Aspect

Below are the results of research on the readiness of the facilities and infrastructure aspect with six indicators:

TABLE V. PERCENTAGE OF THE FACILITIES AND INFRASTRUCTURE ASPECT INDICATORS

No	Indicator	Score	(%)	Category
1	Infrastructure	17	71%	Prepared
2	Manual and mechanical drawing laboratories	54	84%	very well prepared
3	Laboratory of planning and building model/model making	29	48%	Quite prepared
4	Instructor room facilities	20	100%	very well prepared
5	Management of facilities and infrastructure	12	100%	very well prepared
6	Maintenance of facilities and infrastructure	8	100%	very well prepared

Source: research results, 2021.

Based on Table V, the infrastructure indicator with a score of 17 and a percentage of 70.83% is included in the "Prepared" category, Manual and mechanical drawing laboratories scored 54 with a share of 84.38% included in the "Very well Prepared" category, the Laboratory of planning and building model/model making scored 29 with a percentage of 48.33% included in the "Quite Prepared" category. Meanwhile, the instructor room facilities scored 20 with a ratio of 100% in had "Very well Prepared" sort. Following facilities and infrastructure management, get twelve points with 100% included in the "Very well prepared" category. Lastly, the maintenance of facilities and infrastructure gets eight points, with 100% entering the "Very well prepared" type.

TABLE VI. THE FACILITIES AND INFRASTRUCTURE ASPECT READINESS

Total Questions	Total Score	(%)	Category
47	152	84%	very well prepared

Source: research results, 2021.

Table VI shows the readiness of the facilities and infrastructure aspects in preparation for implementing the teaching factory in the DPIB expertise program at SMKN 2 Ciamis accumulatively obtained a score of 152 with a percentage of 83.92% falling into the "Very well prepared" category. Faller and Feldmüller [9] say that vocational schools need facilities and technology in accordance with the industry to pursue teaching factory learning methods so that students can produce goods and services following the industrial market. In their research, Darling-Hammond et al. [10] say that teacher readiness will influence and assist student readiness through learning supported by appropriate facilities and infrastructure according to needs. The availability of infrastructure in schools needs to be considered [5]. There are three practical room infrastructures required by the Building Modeling and Information Design expertise program based on Attachment VI of the Minister of Education and Culture No. 34 of 2018, namely: 1) Mechanical and computer design practice room; 2) The practice room for planning and making building models/models; 3) Instructor room. The criteria for facilities and infrastructure following the industrial world environment are contained in the manual issued by the Director-General of Vocational Education with the title "Norms, Standards, Procedures, and Criteria for Vocational Practice Equipment."

D. The Readiness of the School Management Aspect

Below are the results of research on the readiness of the school management aspect with five indicators:

TABLE VII. PERCENTAGE OF THE READINESS OF THE SCHOOL MANAGEMENT ASPECT

No	Indicator	Score	(%)	Category
1	Leadership	10	83%	very well prepared
2	Organizational Structure	1	11%	Not prepared
3	Standard Operating Procedures for Performance	0	0%	Not prepared
4	Financial Administration	3	33%	Less Prepared
5	Supporting Environment	12	100%	very well prepared

Source: research results, 2021.

Table VII shows the leading indicators and supporting environment indicators are in the "very well prepared" category, the financial administration indicators with a percentage of 33.33% are in the "less prepared" category, and organizational structure indicators and work SOPs are in the "Not prepared" category.

TABLE VIII. THE SCHOOL MANAGEMENT ASPECT READINESS

Total Questions	Total Score	(%)	Category
16	26	45,56%	Quite prepared

Source: research results, 2021.

Based on Table VIII, the readiness of the school management aspect in the implementation of teaching factory learning in the Modeling design and building information vocational program at SMKN 2 Ciamis accumulated 26 with a percentage of 45.56% included in the "Quite Prepared" category. This condition should be a particular concern because the running of a program in schools depends on the readiness of its management. School management is one aspect that affects the process of implementing teaching factory learning. Ricky W. Griffin [11] argues that management is an effective and efficient step to achieving a goal through

planning, organizing, coordinating, and monitoring human resources. Gunawan [12] says a school management structure is an initial stage of implementing the teaching factory.

IV. CONCLUSION

The Teaching factory program needs to be implemented to increase the competency capacity of students in vocational high school. However, its implementation will not achieve optimal results if it is not supported by the readiness of various supporting aspects such as teachers, facilities, industrial cooperation, and management. The research resulted in quite apprehensive facts where the most crucial aspect, namely the management aspect, was at the lowest level with the "quite prepared" category. In contrast, the other elements were in the "prepared" and "very well prepared" categories. School management needs to immediately fix its managerial tools, especially in the preparation of the organizational structure of the program implementer and the practice of standard operating procedures in the implementation of the teaching factory program. Financial administration also needs to be prepared to face the performance of the teaching factory program. By preparing all supporting aspects, it is hoped that the implementation of the teaching factory at SMKN 2 Ciamis can be in accordance with its goal of creating graduates who are ready to face the challenges of industry 4.0 by bridging the gap between the competencies taught in schools and the fundamental competencies needed in the world of work.

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