

The Effectiveness Of An Industry-Based Teaching Factory Model In Improving Machining Competence, Technical Creativity, And Work Readiness Among Vocational High School Students

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Abstract

This study aims to analyze the effectiveness of the Industry-Based Teaching Factory Model in improving machining competence, technical creativity, and work readiness of Mechanical Engineering Vocational High School students in City X. The study used a quantitative approach with an experimental method and a one-group pretest-posttest design. The study sample consisted of 138 students from four Mechanical Engineering Vocational High Schools, namely State Vocational High School A, State Vocational High School B, State Vocational High School C, and State Vocational High School D. Data were collected through competency tests, practical assessments, and technical creativity and work readiness measurement instruments. Data analysis was performed using IBM SPSS Statistics through descriptive statistics, normality tests, and paired sample t-tests. The results showed that after the implementation of the Industry-Based Teaching Factory Model, students experienced improvements in the three aspects studied. This model is effective in strengthening machining competence through production experiences that refer to industrial standards and procedures, developing technical creativity through problem solving and developing alternative solutions, and increasing work readiness through habituation of discipline, responsibility, cooperation, adaptation, and industrial work culture. Thus, the Industry-Based Teaching Factory Model can be an effective vocational learning approach in strengthening the connection between the learning process in vocational schools and industrial demands and supporting the formation of competent, creative, adaptive Mechanical Engineering graduates who are ready to enter the world of work.

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Keywords: Industry Based Teaching Factory Model; machining competence; technical creativity; work readiness; vocational education.

INTRODUCTION

Technological changes and production systems in the manufacturing industry require vocational education to produce graduates who not only master technical skills but are also able to adapt to technology, solve production problems, generate creative solutions, and work according to industry standards. This demand is crucial for Vocational High Schools (SMK) in Mechanical Engineering because the machining learning process needs to provide experiences as close as possible to real work situations. However, the issue of graduates' transition to the workforce remains a challenge. The Central Statistics Agency (BPS) recorded that Indonesia's Open Unemployment Rate (TPT) in February 2026 was still at 4.68% (BPS, 2026a). BPS data based on education also shows that the number of unemployed with a vocational high school education increased from 1,628,517 people in February 2025 to 1,923,756 people in August 2025 (BPS, 2026b). This phenomenon indicates that strengthening the competencies and readiness of vocational high school graduates to transition to the workforce remains a critical issue. In the context of vocational education, Wibowo et al. (2025) also stated that the mismatch between graduate competencies and industry needs remains a structural challenge, particularly when industrial technology advances faster than curriculum, facility, and learning process adjustments. Therefore, learning is needed that can directly connect the competencies students learn with actual industrial standards and practices.

One approach developed to strengthen this relationship is the Teaching Factory (TeFa), a production- or service-based learning model that adopts industry standards, procedures, work culture, and real-world processes. Wahjusaputri and Bunyamin (2022) explain that Teaching Factories can be used to narrow the gap between student competencies and industry needs through the integration of learning and work processes, supported by curriculum, facilities, human resources, and school relationships with the business and industrial world. The relevance of this model is increasingly strong in the field of Mechanical Engineering. Wijanarka et al. (2023), through research on four vocational high schools with machining expertise, found that the overall implementation rate of Teaching Factories reached 89.2%, categorized as very good. However, the study also identified various obstacles, such as rapid technological developments, limited human resource competencies, facility conditions, practical scheduling, and industry



collaboration. These issues demonstrate that the existence of Teaching Factories alone is not enough; their implementation needs to be truly based on needs, standards, production issues, and industry involvement. This is also reflected in the 2026 government policy, which still positions the Teaching Factory as a strategic program in vocational high school education through synchronizing product- or service-based curricula, improving teacher and instructor competencies, and strengthening production-based learning ecosystems (Directorate of Vocational High Schools, 2026). Thus, the development of the Industry-Based Teaching Factory Model is relevant for creating a more authentic learning environment that aligns with the characteristics of manufacturing work.

The urgency of implementing the Industry-Based Teaching Factory Model in Mechanical Engineering Vocational Schools is also related to the need to achieve three important outcomes: machining competence, technical creativity, and work readiness. Machining competence is the main foundation that enables students to carry out manufacturing processes according to procedures, quality standards, equipment usage, and production demands. Wijanarka et al. (2023) showed that Teaching Factory in the machining field is aimed at improving student competency through product-based learning and work processes that resemble industry. However, modern industry requires more than just the ability to carry out predetermined procedures. Students also need technical creativity to analyze problems, develop alternative solutions, improve processes, and produce innovations in completing work. Sutianah et al. (2024) found that the implementation of a life skills-based Teaching Factory can increase student creativity in product design, production, and innovation, as well as develop critical thinking, communication, and collaboration skills. In addition to competence and creativity, work readiness is an important outcome because students must ultimately be able to adapt to standards, discipline, responsibility, teamwork, and problem-solving in the workplace. Sudarsono and Pratama (2025) found that a learning model integrating authentic industrial problems improved student learning outcomes by approximately 20.1%–21.2% in the schools studied and increased student engagement and preparedness for the workplace. Therefore, machining instruction should be directed not only at producing students capable of operating machines but also at developing creativity in solving technical problems and readiness for the industrial work environment.

Although various studies have demonstrated the benefits of Teaching Factory and industry-based learning, there are still research gaps that form the basis of this study. First,



Wijanarka et al. (2023) have studied Teaching Factory specifically in the field of machining, but using Context, Input, Process, and Product (CIPP) evaluation with a focus on the quality of program implementation and management constraints, so they have not directly tested the model's effectiveness on machining competence, technical creativity, and student work readiness simultaneously. Second, Sutianah et al. (2024) have proven the ability of Teaching Factory to enhance creativity, but the study was conducted on creative crafts and production expertise programs so that they have different competency characteristics from Mechanical Engineering. Third, Irfan et al. (2024) evaluated the effectiveness of Teaching Factory through the components of context, input, process, and product, but the research object was in the field of Food Crop and Horticulture Agribusiness. Fourth, Sudarsono and Pratama (2025) have tested industry-oriented learning on work readiness, but using the Industry-Oriented Problem-Based Learning model, not the Teaching Factory. In addition, a systematic review by Wibowo et al. (2025) emphasized the need for integration of industry-standard competency mapping, digital production, and collaborative governance in the development of Teaching Factories, while Rifai et al. (2026) showed that TeFa research still faces gaps in aspects of infrastructure readiness, teacher competency, industry collaboration, digital manufacturing technology integration, and the sustainability of its implementation. Thus, there is still strong research space to empirically test industry-based Teaching Factories in the context of Mechanical Engineering with three integrated student outcomes.

Based on these phenomena and research gaps, this study aims to analyze the effectiveness of the Industry-Based Teaching Factory Model in improving machining competence, technical creativity, and work readiness of Mechanical Engineering Vocational High School students in City X. This model places learning activities in an environment that adapts production processes, quality standards, work culture, technical problem solving, and industrial involvement so that students' learning experiences are closer to real manufacturing work. This is in line with Wahjusaputri and Bunyamin (2022) who emphasize the importance of integrating industrial standards, facilities, learning patterns, and the involvement of the business world and the industrial world in Teaching Factory, and Wibowo et al. (2025) who place the alignment of industrial competencies, production technology, and stakeholder collaboration as the foundation of Teaching Factory that is relevant to manufacturing transformation. Recent policy support also shows that Teaching Factory is still being developed as a contextual learning tool that is relevant to industrial needs and strengthening 21st-century competencies. Therefore, this study is



directed to answer three main questions, namely: (1) is the Industry-Based Teaching Factory Model effective in improving students' machining competence; (2) whether the Industry-Based Teaching Factory Model is effective in increasing students' technical creativity; and (3) whether the Industry-Based Teaching Factory Model is effective in increasing the work readiness of students in Mechanical Engineering Vocational Schools in City X. The research findings are expected to produce empirical evidence regarding the effectiveness of learning that integratedly forms technical competence, technical creativity, and students' work readiness according to the demands of the manufacturing industry.

RESEARCH METHODS

This study used a quantitative approach with an experimental method to test the effectiveness of the Industry-Based Teaching Factory Model in improving machining competence, technical creativity, and work readiness of Mechanical Engineering Vocational High School students in City X (Ghozali, 2021). The research design used a one-group pretest-posttest design, with measurements taken before (pretest) and after (posttest) the treatment. The study sample consisted of 138 students from four schools: 35 students from State Vocational High School A, 36 students from State Vocational High School B, 32 students from State Vocational High School C, and 35 students from State Vocational High School D. Machining competence was measured through competency tests and machining practice assessments, while technical creativity and work readiness were measured using instruments based on indicators of each variable that had been tested for validity and reliability. Data were analyzed descriptively and followed by a paired sample t-test to compare pretest and posttest scores on the same respondents. Before testing the hypothesis, a normality test was conducted on the difference between pretest and posttest scores. The entire data processing and analysis process was carried out using SPSS software, with a significance level of $\alpha = 0.05$, so that a p value < 0.05 indicates a significant difference after implementing the Industry-Based Teaching Factory Model (Ghozali, 2021).

RESULTS AND DISCUSSION

Data Analysis Results

This study involved 138 Mechanical Engineering Vocational High School students from four schools, namely 35 students from State Vocational High School A, 36 students from State Vocational High School B, 32 students from State Vocational High School C, and 35 students from



State Vocational High School D. The analysis was conducted to determine the effectiveness of the Industry-Based Teaching Factory Model in improving machining competence, technical creativity, and work readiness. Measurements were carried out twice, namely before the implementation of the model (pretest) and after the implementation of the model (posttest). Data were analyzed using IBM SPSS Statistics through descriptive statistics, normality tests, and paired sample t-tests.

Descriptive Statistical Analysis

Table 1. Descriptive Statistics Results of Pretest and Posttest

Variables	Measurement	N	Minimum	Maximum	Mean	Standard Deviation
Machining Competence	Pretest	138	36.11	91.67	64.5432	9.71020
	Posttest	138	47.22	100.00	76.1373	11.12838
Technical Creativity	Pretest	138	36.67	90.00	60.0606	10.60497
	Posttest	138	43.33	98.33	70.3141	11.76367
Work Readiness	Pretest	138	44.05	97.62	69.2548	9.10825
	Posttest	138	36.90	100.00	77.6657	11.58604

Source: Processed data (2026).

Based on Table 1, there was an increase in the average value of all variables after the implementation of the Industry-Based Teaching Factory Model. The average machining competence increased from 64.5432 in the pretest to 76.1373 in the posttest, resulting in an average increase of 11.5941 points. In technical creativity, the average value increased from 60.0606 to 70.3141, or an increase of 10.2535 points. Meanwhile, the average work readiness increased from 69.2548 to 77.6657, with an increase of 8.4109 points. Descriptively, these results indicate that after participating in learning using the Industry-Based Teaching Factory Model, students have higher levels of machining competence, technical creativity, and work readiness



compared to before being given treatment. However, the descriptive increase still needs to be confirmed through inferential statistical testing.

Normality Test

A normality test was conducted to determine whether the data met the assumptions of parametric statistics. Given the study sample size of 138 respondents, the interpretation of normality in this output used the Kolmogorov-Smirnov value, with the criterion that if the significance value is >0.05 , the data is declared normally distributed.

Table 2. Normality Test Results

Variables	Measurement	Kolmogorov-Smirnov	Sig.	Information
Machining Competence	Pretest	0.058	0.200	Normal
	Posttest	0.061	0.200	Normal
Technical Creativity	Pretest	0.060	0.200	Normal
	Posttest	0.065	0.200	Normal
Work Readiness	Pretest	0.058	0.200	Normal
	Posttest	0.065	0.200	Normal

Source: Processed data (2026).

Based on Table 2, all significance values in the Kolmogorov-Smirnov test are $0.200 > 0.05$. Thus, the pretest and posttest data on machining competence, technical creativity, and work readiness can be treated as normally distributed data, so that the analysis can be continued using the parametric paired sample t-test.

Paired Sample T-Test

Paired sample t-test used to find out whether there is a significant difference between pretest and posttest scores for the same respondent. The basis for decision making is if the Sig



value. (2-tailed) < 0.05, then there is a significant difference between the results before and after implementing the Industry-Based Teaching Factory Model. On the other hand, if the Sig. > 0.05, then there is no significant difference.

Table 3. Paired Sample T-Test Results

Variables	Pretest Mean	Posttest Mean	Mean Difference	t	df	Sig. (2-tailed)	Information
Machining Competence	64.5432	76.1373	11.5941	16,474	137	<0.000	Significant
Technical Creativity	60.0606	70.3141	10.2535	15,393	137	<0.000	Significant
Work Readiness	69.2548	77.6657	8.4109	14,846	137	<0.000	Significant

Source: Processed data (2026).

The results of the paired sample t-test on machining competence showed an average difference of 11.5941 points, with a t value = 16.474, df = 137, and $p < 0.000$. The 95% confidence interval for the average difference is in the range of 10.2025–12.9858, all of which are above zero. These results indicate that the average value of students' machining competence after the implementation of the Industry-Based Teaching Factory Model is significantly higher than before the implementation of the model. Thus, H1 is accepted, which means that the Industry-Based Teaching Factory Model is effective in improving the machining competence of students of Mechanical Engineering Vocational Schools.

In technical creativity, the average difference between posttest and pretest was 10.2535 points, with a t-value of 15.393, df = 137, and $p < 0.000$. The 95% confidence interval is in the range of 8.9363–11.5707. The average value of technical creativity increased from 60.0606 to 70.3141. These results indicate that after students participated in a learning process that integrated production activities, technical problem solving, job completion, and industry-based work situations, students' technical creativity on average experienced a significant increase. Therefore, H2 is accepted, so that the Industry-Based Teaching Factory Model is effective in improving the technical creativity of Mechanical Engineering Vocational High School students.

Furthermore, the test results on work readiness showed an average difference of 8.4109 points, with a t-value = 14.846, df = 137, and $p < 0.000$. The 95% confidence interval for the average difference is between 7.2907 and 9.5312. The average work readiness score increased



from 69.2548 in the pretest to 77.6657 in the posttest. Thus, H3 is accepted, indicating that the implementation of the Industry-Based Teaching Factory Model is effective in improving students' work readiness. This finding indicates that learning experiences that bring students closer to the processes, procedures, demands, and work culture of the industry can strengthen students' readiness to enter the work environment after completing vocational education.

Hypothesis Testing

Table 4. Hypothesis Testing Results

Hypothesis	Tested Relationships	t	p-value	Decision
H1	Industry-Based Teaching Factory Model → Machining Competence	16,474	<0.000	Accepted
H2	Industry-Based Teaching Factory Model → Technical Creativity	15,393	<0.000	Accepted
H3	Industry-Based Teaching Factory Model → Work Readiness	14,846	<0.000	Accepted

Source: Processed data (2026).

Overall, the results of the study indicate that all three variables experienced an increase after the implementation of the Industry-Based Teaching Factory Model. The largest average increase occurred in machining competence at 11.5941 points, followed by technical creativity at 10.2535 points, and work readiness at 8.4109 points. All paired sample t-test results produced a p value <0.000, so the difference between the conditions before and after the treatment was statistically significant. Thus, based on the one-group pretest-posttest design used, the results of the study provide evidence that the implementation of the Industry-Based Teaching Factory Model was followed by a significant increase in machining competence, technical creativity, and work readiness of Mechanical Engineering Vocational High School students.

DISCUSSION

Effectiveness of Industry-Based Teaching Factory Model on Machining Competence

The results of the study indicate that the implementation of the Industry-Based Teaching Factory Model significantly improved the machining competence of students in Mechanical Engineering Vocational High Schools. The average machining competence score increased from



64.5432 in the pretest to 76.1373 in the posttest, representing an average increase of 11.5941 points. The paired sample t-test yielded a t-value of 16.474, $df = 137$, with $p < 0.001$, indicating a significant difference between students' machining competence before and after the implementation of the model. The 95% confidence interval for the mean difference ranged from 10.2025–12.9858 and did not exceed zero, further strengthening the improvement after treatment. These findings suggest that learning experiences that integrate school practices with industrial work processes provide students with the opportunity to develop more applicable machining skills. In the Industry-Based Teaching Factory, students not only understand the theoretical procedures for using machines, but are also directly involved in production activities that emphasize process accuracy, the use of tools and machines, reading working drawings, fulfilling product specifications, measuring work results, and quality control. Thus, the improvements obtained can be understood as a consequence of a more intensive, contextual learning experience, and one oriented towards the competency standards required in a manufacturing environment.

These findings align with those of Wijanarka et al. (2023), who demonstrated that the overall implementation rate of Teaching Factory in machining competencies was 89.2%, categorized as very good. This study confirms that Teaching Factory in machining can support student competency improvement because the learning process is directed at industry-standard production and creates a school work environment that closely resembles an industrial one. This is understandable because machining competency essentially requires mastery that is developed through repeated practice, the use of production facilities, the completion of actual work, and evaluation based on the quality of the work. When students receive work that resembles an industrial job order, they are required to understand all stages of the process, from reading product requirements, determining machining procedures, selecting appropriate equipment and work parameters, carrying out the production process, and conducting quality control checks. This learning pattern differs from conventional practices, which sometimes only emphasize completing a single skill or task. Teaching Factory instead connects various technical skills into a single production sequence so that students can understand the relationship between knowledge, procedures, quality, time, and responsibility for the work results.

The improvement in machining competence in this study also reinforces the view that the success of vocational learning is determined not only by the availability of machines or practical facilities, but also by the extent to which these facilities are used in a learning environment that



represents industrial work. A study by Rifai et al. (2026) showed that Teaching Factories provide authentic, industry-oriented experiences that can strengthen students' technical skills, although their success is still influenced by infrastructure readiness, teacher competence, industry collaboration, and resource support. Therefore, the improvement in machining competence in this study indicates that the connection between learning activities and the production environment adds value to the process of developing student competency. Students have the opportunity to make mistakes, evaluate results, improve procedures, and adjust work to predetermined standards. This process allows skills to develop from simply the ability to operate machines to the ability to complete machining work comprehensively and responsibly. These results also demonstrate the importance of maintaining industry involvement, technological updates, instructor readiness, and facility suitability for consistent competency development through the Industry-Based Teaching Factory Model.

The Effectiveness of the Industry-Based Teaching Factory Model on Technical Creativity

The results of the study further showed that the Industry-Based Teaching Factory Model effectively increased students' technical creativity. The average technical creativity increased from 60.0606 in the pretest to 70.3141 in the posttest, resulting in an increase of 10.2535 points. The results of the paired sample t-test obtained a value of $t = 15.393$, $df = 137$, with $p < 0.001$, while the 95% confidence interval for the difference in scores was in the range of 8.9363–11.5707. These results indicate that after receiving a Teaching Factory-based learning experience, students demonstrated higher technical creativity abilities compared to the conditions before the treatment. This increase may occur because the activities in the Teaching Factory place students in a more open situation than routine practice. In the process of completing a product or work, students may face material limitations, size differences, accuracy issues, process errors, quality discrepancies, or demands for work completion within a certain time. This condition requires students to not only follow procedures mechanically, but also to analyze the causes of problems, consider several alternatives, develop ideas for solutions, and choose the most feasible technical solution to implement.

These results are consistent with research by Sutianah et al. (2024), who found that the implementation of a life skills-based teaching and learning factory model can increase students' creativity in product design, production processes, and commercialization, as well as develop critical thinking, communication, collaboration, and interpersonal skills. The study explains that



industry-based learning and real-world experiences can provide a more conducive environment for creativity development because students are directly exposed to the product manufacturing process and the various problems that arise during the process. This finding is relevant to the context of Mechanical Engineering in this study. Technical creativity does not always mean creating an entirely new product, but also includes the ability to find more effective work methods, adapt processes when faced with obstacles, determine alternative work processes, make simple modifications, and find solutions so that machining results still meet specifications. With the character of production-based learning, students are not only asked to answer questions with a predetermined answer, but are given the opportunity to develop solutions based on the technical conditions they face. This process can foster aspects of fluency in generating ideas, flexibility in choosing solutions, and the ability to refine ideas based on test results.

Increasing technical creativity is also crucial for addressing the changing nature of work in the modern manufacturing industry. Routine technical skills can become inadequate if students are unable to respond to technological changes, product variations, and production problems that cannot always be resolved simply by following standard instructions. Sutianah et al. (2024) positioned the Teaching Factory as a strategy that not only strengthens production skills but also innovation, creativity, and the ability to face the challenges of the workplace. Meanwhile, Rifai et al. (2026) demonstrated that the development of the Teaching Factory is increasingly linked to the integration of digital manufacturing technology and the need for adaptive competencies. Therefore, the increase in technical creativity in this study can be seen as an indicator that industry-based learning provides space for students to develop from simply implementing procedures to becoming more active individuals in analyzing and solving technical problems. However, technical creativity needs to be continuously supported by project variations, authentic industry issues, access to relevant technology, and the role of teachers as facilitators who provide space for students to experiment, evaluate, and improve solutions without compromising safety and work quality standards.

Effectiveness of the Industry-Based Teaching Factory Model on Work Readiness

The results of the work readiness test indicate that the Industry-Based Teaching Factory Model also significantly improved students' work readiness. The average work readiness score increased from 69.2548 in the pretest to 77.6657 in the posttest, with an average difference of



8.4109 points. The paired sample t-test results showed a t value = 14.846, df = 137, and $p < 0.001$, with a 95% confidence interval of 7.2907–9.5312. These results indicate that students have higher work readiness after participating in the Teaching Factory-based learning. This improvement is understandable because work readiness is not solely formed by mastery of technical skills, but also by students' experience in dealing with situations that resemble the work environment. Through the Industry-Based Teaching Factory Model, students are accustomed to completing work based on targets, timeliness, quality results, application of procedures, discipline, work safety, division of tasks, communication, cooperation, and responsibility for the products they work on. This experience allows students to gain a more realistic picture of the demands of the industrial world and at the same time builds the confidence to transition from an educational environment to a work environment.

The findings of this study are consistent with various previous Teaching Factory studies. A study by Rifai et al. (2026) concluded that Teaching Factories provide authentic, industry-based experiences that strengthen technical and soft skills while improving students' work readiness. The study also noted several previous studies from 2020–2025 that demonstrated the link between Teaching Factories and work readiness, including those by Prianto et al. (2021) and Rosidah and Sutirman (2023). A similar finding can be found in research on Teaching Factories in vocational high schools, which showed that industrial practice experiences can foster responsibility, discipline, work speed, and accuracy in carrying out tasks. Research by Fathiah et al. (2025), for example, found that implementing TeFa allows students to become accustomed to work targets, disciplinary patterns, and company customs, thus minimizing the shock of entering work experience or the industrial environment. These findings support the findings of this study, which suggest that work readiness can develop when schools not only teach how to perform a task but also familiarize students with how that work is performed within the organizational context and industry culture.

The improvement in work readiness also demonstrates that the Industry-Based Teaching Factory Model plays an important role as a bridge between school learning and the demands of the workplace. Students with high technical skills are not necessarily ready for work if they are not accustomed to responsibility, communication, problem-solving, adaptation, target pressure, and coordination with team members. The latest Teaching Factory study shows that collaborative production experiences not only strengthen technical skills but also shape employability attributes such as responsibility, adaptability, communication, cooperation, and decision-making



in production situations. Therefore, the 8.4109-point increase in work readiness in this study indicates that the Teaching Factory process provides a transitional experience that helps students understand the expectations of the work environment before actually entering the industry. However, the lower increase in work readiness compared to the increase in machining competence and technical creativity may also indicate that work readiness is a more complex construct and is not solely determined by learning experiences in school. Work readiness can also be related to self-confidence, personal maturity, industrial practice experience, career orientation, interpersonal skills, and direct exposure to the corporate environment. Therefore, strengthening the Industry-Based Teaching Factory Model should not only focus on production activities, but also be combined with the involvement of industry practitioners, familiarization with work culture, performance evaluation based on company standards, career coaching, and direct work experience so that students' readiness to enter the world of work can develop more optimally.

Overall, the results of the study show that the Industry-Based Teaching Factory Model significantly improved the three outcomes studied: machining competence, technical creativity, and work readiness. The largest improvement was in machining competence, with 11.5941 points, followed by technical creativity with 10.2535 points, and work readiness with 8.4109 points. This pattern suggests that the most direct impact of Teaching Factory learning is on skills directly related to production activities and technical problem solving, while work readiness develops through a broader process. These findings strengthen the position of the Industry-Based Teaching Factory Model as a vocational learning approach that can integrate technical skill mastery, creative thinking skills, and the formation of readiness to face the work environment. However, because the study used a one-group pretest-posttest design without a control group, the effectiveness found should be understood as a significant improvement in the group of students studied after the treatment; future research could use a control group or a more robust experimental design to confirm that the changes truly stem from the implementation of the model.

CONCLUSION

Based on the research results, it can be concluded that the implementation of the Industry-Based Teaching Factory Model is effective in improving machining competence, technical creativity, and work readiness of Mechanical Engineering Vocational High School



students in City X. The implementation of this model is able to provide a more authentic learning experience through the integration of production processes, quality standards, technical problem solving, the use of work procedures, and industrial culture into learning activities. Industry-based learning helps students improve their mastery of machining skills, develop creativity in finding alternatives and solutions to technical problems, and form readiness to face the demands of the world of work such as discipline, responsibility, cooperation, adaptation, and completion of work according to standards. Thus, the Industry-Based Teaching Factory Model can be a relevant vocational learning approach to strengthen the connection between the educational process in Vocational High Schools and industrial needs and produce Mechanical Engineering graduates who are more competent, creative, adaptive, and ready to enter the world of work.

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