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Teaching factory, internal quality assurance system, and vocational teacher quality culture

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Article Info

ABSTRACT

The purpose of this study was to determine the effect of the effectiveness of the application of teaching factory learning and Internal Quality Assurance System on motivation of quality culture. This was a quantitative research which is analyzed using multiple regression. The sample used in this study were 79 teachers who were taken by purposive sampling. The instrument used to obtain data using a questionnaire. The results showed that the regression line equation $\hat{Y} = 17.132 + 0.445X_1 + 0.383X_2$ with the significance test of the F test=60.414 with a significance level of 0.00, meaning that the equation is able to predict changes in the culture of teacher quality caused by changes in variants of teaching factory and Internal Quality Assurance System. The effect of teaching factory and Internal Quality Assurance System on motivation of quality culture stated the value of R^2 is 0.530. In this regard, it can be concluded that there is an influence between teaching factory and Internal Quality Assurance System on motivation of quality culture.

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1.   INTRODUCTION

Vocational High Schools are faced with demands that their graduates can enter the world of industrial, for that since studying, vocational students must know the world of industry [1]-[3]. The things that have become demands include the problem of the low quality of education and the problem of its relevance to the development of community needs in the increasingly open Industrialization and Globalization Era [4]-[6]. The low quality of education is the result of the low quality of the learning process carried out in schools [7], [8]. Although in general education in Indonesia faces a low quality of education, especially learning carried out during the Covid-19 epidemic, teachers in vocational high schools have not been able to distinguish between students who are competent or who are not yet competent, especially teachers who teach productive subjects.

The problems faced in the implementation of education at Vocational High Schools are indicated as still low competency of graduates [9]-[12], so that the inability to meet the demands of the world of work can be indicated because the quality of learning carried out so far is still ineffective [13], inefficient and unable to increase student interest in learning [14]. Regarding this condition, then Vocational High Schools needs to be revitalized by implementing the teaching factory [15]-[17]. This is so that students can improve the

competence of vocational high schools students so that they are in line with the needs of the industrial world [18]. In addition, students can directly practice by producing goods or services that can be sold to consumers.

The main problem faced by vocational high schools is the lack of absorption of graduates in the world of work or industry [19]-[22]. This is because the application of the teaching factory as a miniature model of the industrial world is still not optimal [23]-[26]. This causes students to be less familiar with the industrial world. revitalization of vocational high schools by implementing teaching factory learning requires schools to have business or industrial units in the study rooms [27], [28]. Teaching factory learning is a production-based learning concept in vocational high schools which refers to the standards and procedures that apply in the industry and is carried out in an atmosphere as it happens in the industry [29], [30]. Teaching Factory is a production or service-based learning concept in Vocational High School which refers to the standards and procedures applicable in the industry, so that government, parents and the community need to be close in planning, regulation and implementation. Because the implementation of teaching factory is carried out like an industry, it is hoped that this activity can bridge the competency gap between industry needs and the competencies produced by schools. For example, a vocational high school with competency in marketing expertise, a teaching factory program arranged according to the competence of Vocational High School graduates, namely students can follow the business flow according to the company pattern in order to form harmony between the industrial world and the school. For this reason, the students at the Vocational High School are divided into several divisions according to the needs of the company, such as the service division, packaging, melting, promoting, to producing a product. By implementing the Teaching Factory, vocational high schools can bridge the competency gap between industrial needs and the competencies produced by schools.

To improve the quality of vocational students in order to be able to meet the demands of society as users of educational services, Vocational High School as a formal education institution must implement an internal quality assurance system in accordance with the regulation [31], [32]. The Internal Quality Assurance System is a continuous cycle carried out by the Education Unit to ensure the improvement of the quality of continuing education and the development of a culture of quality education in schools. The application of internal quality assurance system as a driving factor for the implementation of teaching factori has not been carried out continuously [33]. Even though these two things greatly contribute to improving the culture of teacher quality. By improving the culture of teacher quality, an academic atmosphere will be created that supports a conducive learning process [34], [35], namely the teacher supports the creation of eight educational standards and students participate in the learning process optimally and an atmosphere of independence.

To create a quality culture of teachers, it is necessary to formulate and implement programs launched by the government related to the teaching factory program and internal quality assurance system. For this reason, this research is urgent to do, because this research will monitor, evaluate, analyze the implementation of the teaching factory and the internal quality assurance system program, as well as look for the contribution of factors that are thought to influence the creation of a culture of teacher quality. In connection with this condition, this study aims to determine the effect of the application of teaching factory learning and internal quality assurance system on the cultural motivation of teacher quality.

2.   RESEARCH METHOD

This research approach was quantitative. This research used a postpositivist paradigm in developing science and used research strategies such as experiments and surveys that required statistical data [36]-[40]. Quantitative research focused its attention on symptoms that have certain characteristics that vary in human life (variables) [41], where the nature of the relationship between variables is analyzed using statistically objective theories [42]. In this study, the relationship between variables seen is the relationship between Teaching Factory to vocational teacher quality culture, and relationship between internal quality assurance systems to vocational teacher quality culture.

The sampling technique used purposive sampling. The research sample (in this case is vocational high schools) must apply the Teaching Factory and the Internal Quality Assurance System. These two conditions must be fulfilled by the research sample, if only one aspect of the vocational high schools is fulfilled then the junior high school cannot be used as a research sample. In connection with this condition, the subjects in this study were teacher of State vocational high school who had implemented Teaching Factory and the Internal Quality Assurance System in Kebumen Regency. The vocational high school in Kebumen regency that has implemented Teaching Factory and the Internal Quality Assurance System are Vocational High School State at Kebumen 1, Vocational High School State at Kebumen 2, and Vocational High School State at Gombong. From the three schools, the number of productive subject teachers was 79 people.

The variables used in this study theoretically are teaching factory and the internal quality assurance system that affect the creation of a culture of teacher quality. To prove this theory, instruments are needed to measure the Teaching Factory, Internal Quality Assurance System, and teacher quality culture. This instrument is in the form of a questionnaire consisting of 30 item with an answer model using a Likert scale. Questionnaire of Teaching Factory were made referring to indicators: 1) Network, 2) Human resources, 3) Facilities, 4) Learning process, and 5) Practical activities [43]. Questionnaire of Internal Quality Assurance System consist of adapted from 1) Content standards, 2) Process standards, 3) Assessment standards, and 4) PTK standards [43]. The results of Questionnaire of Teaching Factory trial showed that all items were declared valid because the correlation coefficient was more than 0.43 and the reliability coefficient was 0.87. Indicators of Quesionaire motivation of Quality Culture are: 1) Learning program planning; 2) Implementation of learning, guidance and training; and 3) Assessment of learning [44]. The results of the Questionnaire of Internal Quality Assurance System trial showed that all items were declared valid because the correlation coefficient was more than 0.41 and the reliability coefficient was 0.92.

The collected data then analyzed using multiple linear regression. This data analysis technique still considers assumption tests such as linear, normal and multicollinearity. This analysis technique is used to see the effect of the Teaching Factory and the Internal Quality Assurance System on teacher quality culture. The process of calculating regression analysis includes classic assumption tests using SPSS assistance.

3.   RESULTS AND DISCUSSION

Analysis of the data used to test the hypothesis using multiple linear regression techniques. Before using this technique, the assumption test is carried out first, namely: 1) Normality, 2) Linearity, and 3) Multicollinearity. Classical assumptions must be fulfilled in order to obtain a linear regression model with unbiased estimation and reliable testing, so that the conclusions obtained in the research are unbiased [45]–[47].

The normality test aims to see whether the sample used in this study comes from a population with a normal distribution or not [48], [49]. The normality test used the Kolmogorov-Smirnov test with the help of SPSS. The sample is said to come from a population with a normal distribution if the identification coefficient is more than 0.05. The results of this test can be seen in Table 1.

Table 1. Normality test

		Motivation for quality culture	Teaching factory program	Internal quality assurance system
Normal parameters	Mean	103.13	101.67	106.53
	Std. deviation	9.972	9.201	11.192
Kolmogorov-Smirnov Z		1.281	1.101	1.160
Asymp. Sig. (2-tailed)		0.075	0.177	0.136

Based on Table 1, it is found that the coefficient of significance for the variable Teaching Factory is 0.075. Because the significance coefficient for the Teaching Factory variable is more than 0.05, it can be concluded that the sample comes from a population with a normal distribution. The Internal Quality Assurance System obtained a significance coefficient of 0.117. Because the coefficient of significance for the Internal Quality Assurance System variable is more than 0.05, it can be concluded that the sample comes from a population with a normal distribution. Whereas in the motivation for quality culture, the coefficient of significance is 0.136. Because the coefficient of significance for the teacher quality culture variable is more than 0.05, it can be concluded that the sample comes from a population with a normal distribution.

Linearity test aims to determine the relationship between the independent variable and the dependent variable in a linear condition [50]. The results of the linearity test using the F test can be seen in Tables 1 and Table 2. The assumptions used for this test, If a significance coefficient of deviation from linearity is more than 0.05 in the linearity section, then the relationship between the two variables tested is in linear conditions.

Based on the Table 2, it is found that the F value on the Teaching Factory variable with a motivation of quality culture is 1.368 with a significance coefficient on deviation from linearity of 0.166. Due to the significance coefficient obtained is more than 0.05, it can be concluded that the Teaching Factory Program and Quality Culture have a linear relationship. On the Table 3, it is found that the F value on the Internal Quality Assurance System with a motivation of quality culture is 0.718 with a significance coefficient on deviation from linearity of 0.812. Due to the significance coefficient obtained is more than 0.05, it can be concluded that the Internal Quality Assurance System and Quality Culture have a linear relationship.

Table 2. Linearity test of teaching factory program with motivation of quality culture

		Sum of squares	df	Mean square	F	Sig.
	(Combined)	5662.568	28	202.235	4.829	0.000
Between groups	Linearity	4114.214	1	4114.214	98.230	0.000
	Deviation from Linearity	1548.353	27	57.346	1.369	0.166
Within groups		2094.167	50	41.883		
Total		7756.734	78			

Table 3. Linearity test of internal quality assurance system with quality culture

		Sum of squares	df	Mean square	F	Sig.
	(Combined)	5182.910	28	185.104	3.596	0.000
Between groups	Linearity	4171.217	1	4171.217	81.032	0.000
	Deviation from Linearity	1011.694	27	37.470	0.728	0.812
Within groups		2573.824	50	51.476		
Total		7756.734	78			

The multicollinearity test aims to see whether there is a correlation or is there a relationship between independent variables in a study [51]. If in a study, the independent variable has a correlation, then regression analysis cannot be used. If this happens, path analysis can be used as an alternative to analyze the research data obtained. The multicollinearity test in this study used the t test. If a tolerance value is obtained greater than 0.10, it can be concluded that there is no multicollinearity in the regression model. The multicollinearity test results can be seen in Table 4.

Tabel 4. Result of multicollinearity test

	Unstandardized coefficients		Stand. coefficients	t	Sig.	Collinearity statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	17.132	8.012		2.138	0.036		
Teaching factory	0.445	0.115	0.410	3.871	0.000	0.452	2.211
Internal quality assurance system	0.383	0.094	0.430	4.053	0.000	0.452	2.211

Based on Table 4, the results show that there is no multicollinearity for both teaching factory and Internal Quality Assurance System. This can be seen from the VIF value of 2.211 with the value of tolerance of 0.452 more than of 0.10.

After all the classical assumptions for the linear regression test are fulfilled, namely the sample comes from a normally distributed population, the relationship between the independent and dependent variables is in a linear condition, and the independent variables are not interconnected, the next step is to perform a linear regression analysis. Liner regression analysis aims to test the hypothesis proposed in this study, while the hypothesis proposed in this study is that there is a relationship between Teaching Factory and Internal Quality Assurance System against motivation of Quality Culture. In this multiple linear regression analysis, multiple linear regression analysis, determination analysis, coefficient regression test will be sought, and coefficient partial test.

Multiple linear regression analysis is a linear relationship between two or more independent variables and the dependent variable to obtain a regression line equation that can be used to predict changes in the variation of the dependent variable caused by changes in variations in the independent variable. The results of multiple linear regression can be seen in the Table 5.

Table 5. Results of multiple regression analysis

Model	Unstandardized coefficients		Stand. coefficients	t	Sig.
	B	Std. error	Beta		Std. error
(Constant)	17.132	8.012		2.138	0.036
Teaching factory	0.445	0.115	0.410	3.871	0.000
Internal quality assurance system	0.383	0.094	0.430	4.053	0.000

Based on Table 5, it is found that the regression equation is $\hat{Y} = 17.132 + 0.445X_1 + 0.383X_2$, Where Y is motivation of Quality culture, X_1 is teaching factory, and X_2 is Internal Quality Assurance System. Furthermore, it is necessary to test whether the regression line equation obtained is significant or not. To test the significance of this regression line equation, the ANOVA test was performed as shown in Table 6.

Table 6. ANOVA

Model	Sum of squares	df	Mean square	F	Sig.
Regression	4761.680	2	2380.840	60.414	0.000
Residual	2995.054	76	39.409		
Total	7756.734	78			

Based on Table 6, it can be concluded that the regression line equation obtained is significant. Because the calculation results obtained F of 60.414 with a significance coefficient of 0.000.This means that the variable Teaching Factory and Internal Quality Assurance System can be used to predict the motivation of Quality Culture.

Determination analysis is used to determine the percentage amount of the influence of the independent variable on the dependent variable. The calculation results can be seen in Table 7.

Table 7. Analysis of determination

R	R square	Adjusted R square	Std. error of the estimate
0.784	0.614	0.604	6.278

Based on Table 7, it is found that the effect of Teaching Factory and Internal Quality Assurance System on motivation of Quality Culture can be seen from the value of R of 0.784 and R^2 of 0.530. This means that the contribution of the Teaching Factory and Internal Quality Assurance System on motivation of Quality Culture is 53%, while the remaining 47% is influenced by other factors. To find out the relationship between each independent variable, the results of the partial correlation calculation can be seen, while the summary of the calculation results can be seen in Table 8.

Table 8. Results of partial correlation analysis

Variable		Motivation of quality culture
Internal quality assurance system by looking program teaching factory	Correlation	0.406
	t-value	5.959
	Significance (2-tailed)	0.000
Teaching factory by looking internal quality assurance system	Correlation	0.422
	t-value	6.365
	Significance (2-tailed)	0.000

Based on Table 8, it is found that the partial correlation for the Internal Quality Assurance System by considering the Teaching Factory Program is 0.406 with a significance coefficient of 0.000. This means that the Internal Quality Assurance System is very influential on the motivation of Quality Culture. In addition, for the teaching factory by considering the Internal Quality Assurance System, the correlation coefficient is 0.422 with a significance coefficient of 0.000. This is mean that the teaching factory is very influential on the motivation of Quality Culture.

Vocational High School is one of the levels of secondary education with the specialty of preparing graduates to be ready for work. So that Vocational High School graduates are ready to work in the world of work or industry, the government seeks to: 1) Strengthen adaptive abilities which include applied mathematics and applied science skills; 2) Strengthen entrepreneurial skills; 3) Strengthen national and international language skills; 4) Strengthen basic skills information and communication technologies (ICT); and 5) Implementing the teaching factory [52].

Teaching factory learning is a production-based learning concept in vocational high schools which refers to the standards and procedures that apply in the industry and is carried out in an atmosphere as it happens in the industry [29], [30]. By implementing the Teaching Factory, vocational high schools can bridge the competency gap between industrial needs and the competencies produced by schools. The implementation of the teaching factory is able to foster students' attitudes to learn and work as the demands of the industrial world in the field. This causes teachers to feel called to fulfill their obligations to be able to work, to teach their students to have the ability to work in accordance with the demands of the industrial world. This encourages teachers to create a culture of teacher quality in teaching.

School as one of the places for implementing learning activities will determine the quality of education quality. Therefore schools must implement education quality assurance, among them internal

quality assurance [53]-[55]. Improving the quality of education has become a demand for education administering institutions, if these institutions will continue to exist in the current intense competition.

Increasing the development and quality assurance of education in schools is the joint responsibility of the government and educational institutions in certain educational units. For this reason, educational institutions in each educational unit are required to always improve the quality of education through internal quality assurance. Internal quality assurance is a responsibility that must be fulfilled, so that stakeholders will believe in the educational institution. With today's increasingly fierce competition in education, educational institutions have realized the importance of improving quality through internal quality assurance. This is greater than the effective contribution given by the effectiveness variable of teaching factory learning. This shows that educational institutions are aware of the importance of improving quality to meet the demands of stakeholders in response to increasingly fierce competition.

4.   CONCLUSION

Based on the results of the research and discussion above, it can be concluded: 1) Teacher quality culture can be predicted by the implementation of teaching factory learning and the implementation of Internal Quality Assurance System; 2) Independently, teaching factory teaching and the implementation of Internal Quality Assurance System each have a positive and significant relationship; and 3) The effective contribution given by the implementation of the Internal Quality Assurance System is greater than the effective contribution given by the effectiveness of teaching factory learning. This shows that there is awareness for education providers about the importance of improving the quality of education by implementing Internal Quality Assurance System.

REFERENCES

[1]   N. Maryanti, R. Rohana, and M. Kristiawan, "The Principal's Strategy In Preparing Students Ready To Face the Industrial Revolution 4.0," *Int. J. Educ. Rev.*, vol. 2, no. 1, pp. 54-69, 2020, doi: 10.33369/ijer.v2i1.10628.

[2]   N. Nurjanah, F. Rizal, A. Yulastri, Y. Lizar, and B. Hayadi, "Evaluation of Program Implementation in Industrial Work Practices of State Vocational High School 3 of Students in Batam," in *1st Workshop on Environmental Science, Society, and Technology*, 2019, pp. 43-48, doi: 10.4108/eai.8-12-2018.2284019.

[3]   A. Ambiyar, A. Yulastri, M. Yupelmi, and P. Paryono, "Relevance of the Productive Course of Hair Beauty in Vocational High Schools to Industry Needs," *J. Pendidik. Teknol. dan Kejuru.*, vol. 24, no. 1, pp. 125-131, 2018, doi: 10.21831/jptk.v24i1.18388.

[4]   H. Widodo, "A Portrait of Education in Indonesia and Its Readiness in Facing the Asian Economic Community *(in Indonesia)*," *Cendekia J. Educ. Soc.*, vol. 13, no. 2, pp. 293-308, 2016, doi: 10.21154/cendekia.v13i2.250.

[5]   A. Asnawan, "Policy Relevance in Improving the Quality of Islamic Religious Education *(in Indonesia)*," *Tafhim Al-'Ilmi*, vol. 11, no. 2, pp. 223-240, 2020, doi: 10.37459/tafhim.v11i2.3751.

[6]   L. Tikly and A. M. Barrett, "Social justice, capabilities and the quality of education in low income countries," *Int. J. Educ. Dev.*, vol. 31, no. 1, pp. 3-14, 2011, doi: 10.1016/j.ijedudev.2010.06.001.

[7]   H. Susanto and S. Sudiyatno, "Data mining to predict student achievement based on socioeconomic, motivation, discipline and past achievements *(in Indonesia)*," *J. Pendidik. Vokasi*, vol. 4, no. 2, pp. 222-231, 2014, doi: 10.21831/jpv.v4i2.2547.

[8]   P. Glewwe, E. Hanushek, S. Humpage, and R. Ravina, "School Resources and Educational Outcomes in Developing Countries: A Review of the Literature from 1990 to 2010. NBER Working Paper No. 17554.," *Natl. Bur. Econ. Res.*, 2011, doi: 10.3386/w17554.

[9]   Zurqoni, H. Retnawati, J. Arlinwibowo, and E. Apino, "Strategy and implementation of character education in senior high schools and vocational high schools," *J. Soc. Stud. Educ. Res.*, vol. 9, no. 3, pp. 370-397, 2018, doi: 10.17499/jsser.01008.

[10]   A. Azevedo, G. Apfelthaler, and D. Hurst, "Competency development in business graduates: An industry-driven approach for examining the alignment of undergraduate business education with industry requirements," *Int. J. Manag. Educ.*, vol. 10, no. 1, pp. 12-28, 2012, doi: 10.1016/j.ijme.2012.02.002.

[11]   S. Martin, "Routledge handbook of sustainable development in higher education," *Environ. Educ. Res.*, vol. 24, no. 2, pp. 301-305, 2018, doi: 10.1080/13504622.2016.1272673.

[12]   E. Soesilowati and C. B. Utomo, "Implementation of School-Based Management Policy at SMK Negeri 4 Kendal *(in Indonesia)*," *Educ. Manag.*, vol. 6, no. 2, pp. 155-162, 2017.

[13]   M. U. Musthofa and H. Suswanto, "Industrial Work Practice Analysis of Vocational High School Students in Adjusting the Needs of the World of Work *(in Indonesia)*," *Semin. Nas. Sist. Inf. Fak. Teknol. Inf. UNMER Malang*, no. 9, pp. 244-251, 2017.

[14]   C. J. Ramnanan and L. D. Pound, "Advances in medical education and practice: Student perceptions of the flipped classroom," *Adv. Med. Educ. Pract.*, vol. 8, pp. 63-73, 2017.

[15]   N. S. Perdana, "Assessment of the Implementation of Teaching Factory Model Learning in Efforts to Improve the Quality of Graduates *(in Indonesia)*," *J. Serunai Adm. Pendidik.*, vol. 7, no. 1, pp. 43-57, 2019, doi: 10.37755/jsap.v7i1.116.

[16]   V. M. Ringgawati, "Principal's Strategy in Improving the Quality of Graduates (Multisite Study at SMAN 1 Blitar and SMAN 1 Sutojayan) *(in Indonesia)*," PhD Thesis. Universitas Islam Negeri Maulana Malik Ibrahim, Malang, Indonesia, 2016.

[17]   B. Pracihara, "Presidential Instruction No. 9 of 2016 (Vocational Revitalization) Stimulates Vocational Schools in the Arts and Creative Industries in the Development of the Creative Economy *(in Indonesia)*" *Semin. Nas. Seni dan Desain Membangun Tradisi Inov. Melalui Ris. Berbas. Prakt. Seni dan Desain. FBS Unesa.*, vol. 2016, no. 9, 2017, pp. 313-319.

[18]   R. Bakar, "The Effect Of Learning Motivation On Student's Productive Competencies In Vocational High School, West Sumatra," *Int. J. Asian Soc. Sci.*, vol. 4, no. 6, pp. 722-732, 2014.

[19]   E. Larosa and S. Munadi, "Level of Absorption and Suitability in the Field of Machining Work among Vocational School Graduates in Yogyakarta Region," *Am. J. Educ. Res.*, vol. 7, no. 11, pp. 859-864, 2019, doi: 10.12691/education-7-11-16.

[20]   T. Sariwulan, Widodo, N. S. Perdana, Fajarini, and I. Agung, "The influence of absorption graduates vocational education: A case study," *Acad. J. Interdiscip. Stud.*, vol. 9, no. 2, pp. 55-55, 2020, doi: 10.36941/ajis-2020-0023.

[21]   S. A. Pratama, E. T. Winanti, and A. Wardhono, "Profile of 3 years and 4 years vocational school Relationship with the preparation of graduates Building engineering expertise program," *Int. J. Educ. Vocat. Stud.*, vol. 1, no. 6, pp. 623–626, 2019, doi: 10.29103/ijevs.v1i6.1787.

[22]   N. Perdana, "Optimizing Workforce Absorption of Vocational High School Graduates to Prepare for the Era of Industrial Revolution 4.0," *Mimb. Pendidik.*, vol. 4, no. 2, pp. 127-142, 2019, doi: 10.17509/mimbardik.v4i2.22203.

[23]   A. Kuswantoro and A. Kuswardinah, "Teaching Factory Planning in an Effort to Instill Entrepreneurship Values in SMK Negeri 6 Semarang *(in Indonesia)*," *J. Educ. Res. Eval.*, vol. 1, no. 2, pp. 93-100, 2012

[24]   D. Yunanto, "Implementasi Teaching Factory di SMKN 2 Gedangsari Gunungkidul," *Vidya Karya*, vol. 31, no. 1, pp. 29-36, 2016, doi: 10.20527/jvk.v31i1.3971.

[25]   S. S. Dewi and P. Sudira, "The Contribution of Teaching Factory Program Implementation on Work Readiness of Vocational High School Students In Makassar," *J. Educ. Sci. Technol.*, vol. 4, no. 2, pp. 126-131, 2018, doi: 10.26858/est.v4i2.6434.

[26]   I. N. G. Darmawan, B. Sumitro, and S. Djasmi, "Evaluation of Teaching Factory Management at the Hotel Training Production Unit of the Kridawisata Vocational High School Bandar Lampung *(in Indonesia)*," *FKIP Univ. Lampung*, 2017.

[27]   G. Chryssolouris, D. Mavrikios, and L. Rentzos, "The Teaching Factory: A Manufacturing Education Paradigm," in *Procedia CIRP*, vol. 57, 2016, pp. 44-48, doi: 10.1016/j.procir.2016.11.009.

[28]   L. Rentzos, M. Doukas, D. Mavrikios, D. Mourtzis, and G. Chryssolouris, "Integrating manufacturing education with industrial practice using teaching factory paradigm: A construction equipment application," in *Procedia CIRP*, vol. 17, 2014, pp. 189-194, doi: 10.1016/j.procir.2014.01.126.

[29]   D. H. Martawijaya, "Developing a Teaching Factory Learning Model To Improve Production Competencies Among Mechanical," *J. Tech. Educ. Train. JTET.*, vol. 4, no. 2, pp. 45-56, 2012.

[30]   S. Wahjusaputri, E. Marlina, and S. Latifah, "Developing the teaching factory learning media in a public vocational high school," *J. Pendidik. Vokasi*, vol. 4, no. 2, pp. 46-56, 2020, doi: 10.21831/jpv.v10i1.30222.

[31]   Ministry of Education and Culture Republic of Indonesia, *Instructions for the Implementation of Education Quality Assurance by Education Units. Ministry of National Education (in Indonesia)*. Jakarta: Kementrian Pendidikan dan Kebudayaan, 2016.

[32]   D. Darmaji, M. Mustiningsih, and I. Arifin, "Quality Management Education in the Industrial Revolution Era 4.0 and Society 5.0," in *5th International Conference on Education and Technology (ICET 2019)*, 2019, pp. 565-570, doi: 10.2991/icet-19.2019.141.

[33]   F. Rosdiana and U. R. Soedarmo, "Quality Assurance System in Realizing School Quality in Model Schools and Impact Schools *(in Indonesia)*," *Manaj. Pendidik.*, vol. 3, no. 1, pp. 1-6, 2019.

[34]   A. D. Wardani, *et al.*, "Student Learning Motivation: A Conceptual Paper," in *2nd Early Childhood and Primary Childhood Education (ECPE 2020)*, 2020, pp. 275-278.

[35]   A. M. Abubakar, Y. Abubakar, and J. D. Itse, "Students' engagement in relationship to academic performance," *J. Educ. Soc. Sci.*, vol. 8, no. 1, pp. 5-9, 2017.

[36]   Y. K. Djamba and W. L. Neuman, "Social Research Methods: Qualitative and Quantitative Approaches," *Teach. Sociol.*, vol. 30, no. 3, 2002, doi: 10.2307/3211488.

[37]   W. L. Neuman, *Social Research Methods: Qualitative and Quantitative Approaches*. University of Wisconsin, Whitewater, 2011.

[38]   R. Hordósy, "Educational research and inquiry: qualitative and quantitative approaches," *Eval. Res. Educ.*, vol. 24, no. 3, pp. 222-223, 2011, doi: 10.1080/09500790.2011.582692.

[39]   D. F. Treagust, M. Won, and R. Duit, "Paradigms in science education research," in *Handbook of Research on Science Education, Volume II*, 2014.

[40]   K. Lowing, "Educational Research and Inquiry: Qualitative and Quantitative Approaches. Edited by D. Hartas," *Br. J. Educ. Stud.*, vol. 59, no. 3, pp. 350-351, 2011, doi: 10.1080/00071005.2011.611285.

[41]   G. Goertz and J. Mahoney, *A tale of two cultures: Qualitative and quantitative research in the social sciences*. Princeton University Press, 2012.

[42]   J. W. Creswell, *Research Design Qualitative, Quantitative, and Mixed Second Edition*. Sage Publication, 2012.

[43]   A. W. Khurniawan and T. Haryani, *Grand design of teaching factory and technopark development in Vocational*

High School (in Indonesia). Jakarta: Direktorat Pembinaan Sekolah Menengah Kejuruan. Direktorat Jenderal Pendidikan Dasar dan Menengah Kementerian Pendidikan dan Kebudayaan, 2016.

[44] Law of the Republic of Indonesia, *Law of the Republic of Indonesia Number 14 of 2005 on Teachers and Lecturers (in Indonesia)*, 2005.

[45] P. Das, "Linear Regression Model: Relaxing the Classical Assumptions," *Econometrics in Theory and Practice*, pp. 109-135, 2019.

[46] H. Best, C. Wolf, B. Meuleman, G. Loosveldt, and V. Emonds, "Regression Analysis: Assumptions and Diagnostics," in *The SAGE Handbook of Regression Analysis and Causal Inference*, 2014.

[47] M. N. Williams, C. A. G. Grajales, and D. Kurkiewicz, "Assumptions of multiple regression: Correcting two misconceptions," *Pract. Assessment, Res. Eval.*, vol. 18, no. 18, pp. 1-18, 2013.

[48] A. Ghasemi and S. Zahediasl, "Normality Tests for Statistical Analysis: A Guide for Non-Statisticians Asghar," *Int. J. Endocrinol. Metab.*, vol. 10, no. 2, pp. 486-489, 2012, doi: 10.5812/ijem.3505.

[49] W. Malmia, *et al.*, "Problem-based learning as an effort to improve student learning outcomes," *Int. J. Sci. Technol. Res*, vol. 8, no. 9, pp. 1140-1143, 2019.

[50] Budiyono, *Statistic for research (in Indonesia)*. Solo: UNS Press, 2015.

[51] A. Muhe and A. Tawe, "The effect of the entrepreneurial learning design on students' entrepreneurial competence in vocational high schools in makassar," *Int. J. Environ. Sci. Educ.*, vol. 11, no. 9, pp. 3147-3159, 2016, doi: 10.12973/ijese.2016.911a.

[52] Ministry of Education and Culture Republic of Indonesia, 2017-2019 *vocational high school development roadmap (in Indonesia)*, 2016.

[53] N. Gustini and Y. Mauly, "Implementation of the Internal Quality Assurance System in Improving the Quality of Basic Education *(in Indonesia)*," *J. Isema Islam. Educ. Manag.*, vol. 4, no. 2, pp. 229-244, 2019, doi: 10.15575/isema.v4i2.5695.

[54] A. L. N. Zahrok, "I implementation of the Internal Quality Assurance System in Vocational High Schools (SMK) *(in Indonesia)*," *J. Akuntabilitas Manaj. Pendidik.*, vol. 8, no. 2, pp. 196-204, 2020, doi: 10.21831/jamp.v8i2.31288.

[55] Deisy Sampul, Benny B. Binilang, J.F. Senduk, and F.J.A. Oentoe, "Implementation of the Internal Quality Assurance Process: Quality Mapping Analysis at State Senior High School in Tomohon City, North Sulawesi, Indonesia," *Int. J. Recent Educ. Res.*, vol. 1, no. 2, pp. 124-133, 2020, doi: 10.46245/ijorer.v1i2.43.

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