



## Indonesian Vocational Engagement (I-VOCATIE): A New Concept in Improving Teacher Competencies 4.0

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**Abstract:** The industrial revolution 4.0 is an era in which the industry collaborates cyber technology and automation so that it demands adaptation and transformation in various fields, especially in the field of vocational education. The condition of vocational education disparities in Indonesia is very high. Teachers who are really involved and have competence in the vocational field are needed. That is, the teacher experiences a unified whole within himself between the profession, professionalism, self-capacity and work itself which shows the totality of work but not workaholics called the Indonesian Vocational Teacher Engagement (I-VOCATIE). There are two formulations of the problem, namely: (a) what is the tendency of the condition of vocational teacher engagement in Indonesia? and (b) what is the most powerful dimension determining the formation of vocational teacher engagement in Indonesia? The research design was deployed a surveying method using the Neuroresearch model. The Neuroresearch method is a research method developed by Sasmoko which is a mixed method which consists of three research phases, namely exploratory research, explanatory research and exploratory research. These three stages can be done at once and can also be done alone. In this paper, we only used two stages, there are exploratory research and explanatory research. It was based on multistage sampling technique, the total sample of 856 vocational teachers in 30 provinces in Indonesia were managed to be collected. Data collection techniques with a Likert scale questionnaire ranging from 1 to 5. The results of the study: (a) vocational teachers in Indonesia tend to have internalized teacher professional status and the profession has become an interesting thing teachers develop significantly at  $\alpha < 0.05$ , and (b) Nation Character (Nat\_Char\_X4) is the most powerful dimension determining the formation of vocational teacher engagement in Indonesia (Voc\_TeachE\_Y). Increasing the teacher's performance will improve the nation character of vocational teachers.

**Keywords:** IR 4.0, teacher competencies, teacher engagement, neuroresearch

## 1. Introduction

In dealing with industry 4.0, vocational education has become one of the important areas in realising ready-made workforce that has fulfilled the competence of the industrial era 4.0. Industry concept 4.0 itself is characterised by a complex and flexible system that includes the development of digital manufacturing technology, network communication technology, computer technology, automation technology and various other technologies that can only be mastered by those who have the quality of education in accordance with expected standards (Benešová & Tupa, 2017; Zhou, Liu, & Zhou, 2016). With the industrial revolution, vocational education should be able to position itself as an education that has an industrial replica system, so that the minimum competency of graduates is in line with the conditions of the revolutionary industry. To be able to realise this, the role, capacity and competence of vocational education, teachers should also be in line with the industry that is undergoing the revolution. The paradigm of vocational teachers must change not only to educate graduates just to be ready to train, but to be prepared to work based on the needs of the industry that is evolving wave 4.0 so that it requires teacher competence 4.0.

The tangible manifestation of this change is that vocational teachers experience totality of themselves both in terms of cognitive, attitude, psychomotor, vocational competence, the professionalism of 4.0 era workers and their capacities that are relevant to the needs of an evolving industry. The totality of self becomes a unified whole in the vocational teacher in the industrial era 4.0 which was later referred to in this study as Indonesian Vocational Engagement (I-Vocatie) as a form of vocational teacher 4.0. The concept of I-Vocatie originates from the concept of teacher engagement, which describes the profession, professionalism, self-capacity and works itself into a unified whole within the teacher that shows the totality of work but not a workaholic. This I-Vocatie study belongs to the Positive Psychology domain where Indonesian Vocational Engagement provides a decisive role in realising vocational education graduates in Indonesia being able to be ready to use or can be said to have the readiness to change. Teacher engagement has been shown to be able to have a significant impact on increasing student achievement (Louis & Smith, 1991; Moskal, Stein, & Golding, 2016; Seligman, Ernst, Gillham, Reivich, & Linkins, 2009).

To meet the educational incarnations that lead to education 4.0, teachers are increasingly required to modify and develop their competencies (Harkins, 2008). The educational capacity that is able to facilitate students to adapt to the industrial revolution 4.0 is an important part that must be run by teachers. The evolution of teacher competence will become a benchmark for education managers, so that teacher readiness to face measurable education 4.0. Teacher engagement is closely related to the quality of a teacher's work life and governance in schools. Structure, programs and activities implemented in schools directly or indirectly will have an impact on the high level of teacher engagement (Louis & Smith, 1991; Sasmoko et al., 2017). The teacher has a great responsibility as an agent who is able to bring change so that he can realise professionalism as part of his engagement (Mohd Hamzah, Yakop, Nordin, & Rahman, 2011).

Indonesian Vocational Engagement has various factors that influence as well as various factors as impacts. And vocational education teachers are called professionals when their engagement capacity becomes professionally autonomous. And this is one of the factors considered capable of predicting vocational teacher engagement in Indonesia. As a result of the vocational teacher experiencing engagement, the vocational teacher then experiences job satisfaction positively. That is, with the autonomy depicted by the teacher engagement, the teacher is considered capable of handling turmoil and various unpredictable innovations immediately and appropriately (Skaalvik & Skaalvik, 2014). Engaged vocational teachers will show motivation at work, to improve the learning process effectively. This engagement is not just cognitive and emotional but also includes social factors (Klassen, Yerdelen, & Durksen, 2013).

Cognitively, teachers who engage usually will instil values and find ways to engage with their knowledge so as to produce new knowledge (Boyd, 2011; Gardee & Brodie, 2015). Emotionally and socially, teachers who pledge will be seen from a variety of their styles, especially in responding to a topic, question or method applied, so as to be able to make the class different (Burns, 2010; Wang & Eccles, 2013). The condition of vocational teachers who are involved becomes important for every teacher. The success of teachers in vocational schools will be felt by students' benefits because it is directly related to work, so teachers who engage must have a passionate understanding, commitment and enjoy the fulfilment of technical competencies needed (Wolf, 2011). This is where the position of the vocational school becomes important in realising teachers who are able to run a balanced education program as a transition from school to the world of work (Hanushek, Woessmann, & Zhang, 2017).

This study aims to see the teacher engagement of teachers in vocational schools in Indonesia named Indonesian Vocational Engagement (I-Vocatie) as a form of competent Indonesian vocational teachers in the industrial revolution era 4.0. Basically, the concept of vocational teacher engagement was developed from previous research namely the Indonesian Teacher Engagement Index by adjusting to the term Vocational because it is applied in vocational schools, to produce a new concept of Indonesian Vocational Teacher Engagement (I-Vocatie). The Indonesian Teacher Engagement was developed from measuring tools that were developed previously namely the Indonesian Teacher Engagement Index (ITEI) (Sasmoko, Abbas, Indrianti, & Widhoyoko, 2018; Sasmoko, Doringin, Indrianti, Goni, & Ruliana, 2018; Sasmoko, Indrianti, Khan, Nurkamto, & Harsoyo, 2014). ITEI refers to the dynamic and comprehensive concept between positive psychological conditions (Seligman & Csikszentmihalyi, 2000; Seligman, Steen, Park, & Peterson, 2005), the meaning of positive education (Seligman et al., 2009), the character of teachers as Indonesian people, teacher performance as a benchmark (Koopmans

et al., 2011; Rotundo, 2000; Rotundo & Sackett, 2002), nationalism leadership engagement (Indrianti et al., 2011; Rotundo, 2000; Rotundo & Sackett, 2002), nationalism leadership engagement (Indrianti et al., 2017) and teacher competence as mentioned in the Teacher and Lecturer Law (Republic of Indonesia Government, 2005).

## 2. Research Method

The research method used is a survey using the Neuroresearch approach, which is a mixed-method through 2 stages, namely exploratory and explanatory research (Fios, Sasmoko, & Gea, 2016; Sasmoko; Ying, 2015; Sasmoko & Anggriyani, 2016). The Neuroresearch method is a mixed-method which consists of three research phases, namely exploratory research, explanatory research and exploratory research. These three stages can be done at once and can also be done alone. In this paper, we only used two stages; there are exploratory research and explanatory research.

Exploratory research is carried out at an early stage, namely with a qualitative research format. The exploratory stage is the stage where the researcher explores and studies the literature on various theoretical studies regarding Vocational Teacher Involvement. This stage is very important in the process of generating theoretical constructs, including finding the dimensions and indicators that make up the construct.

After the construct was found, the next step was to validate the content through expert judgment to qualitatively assess whether the instrument was able to measure the involvement of SMK teachers in Indonesia. The assessment is carried out by education experts in Indonesia through focus group discussions so that they are able to validate the theoretical constructs that have been prepared.

The second stage is explanatory research which includes 3 stages. First, perform the construct validity of the I-Vocatie instrument. The test was conducted using the Orthogonal Iteration approach with a sample of 60 vocational teachers with Pearson table criteria significance level  $\alpha < 0.05$  yielded 0.254. The result, 44 items of I-Vocatie instruments are all valid with the level of magnitude of measuring the I-Vocatie variable, which is done with Cronbach Alpha ( $\alpha$ ) generated by 0.964. Second, find the tendency of engagement conditions for vocational teachers in Indonesia. Third, find the dimensions or indicators that most determine the formation of ideal conditions for vocational teacher engagement in Indonesia. This stage uses a Binary Segmentation Analysis

The study population was all vocational school teachers in Indonesia. Sampling technique with multistage sampling. The first stage, with cluster sampling that is done by setting 3 provinces in each region of Indonesia (west, central and east). The second stage, with the second cluster sampling by setting 3 regencies/cities for each province. And the typographical stage, with random sampling that is set each of 3 vocational schools in each district/city randomly. The number of research samples were 856 vocational teachers covering 34 provinces in Indonesia. Data collection techniques with a Likert scale questionnaire with a scale range of 1 to 5.

## 3. Result

### 3.1 Exploratory Research

Exploratory research that has been carried out through literature studies has produced a theoretical construct for Indonesian Vocational Teacher Engagement (I-Vocatie). Indonesian Vocational Teacher Engagement (I-Vocatie) is an Indonesian vocational teacher who positions himself not only as a teacher but also helps shape professional characteristics as an Indonesian model educator. The dimensions and indicators of I-Vocatie that have been validated through expert judgment are the development of a positive psychological condition of teachers, the ability of teachers to interpret education positively, the character of teachers who are nationalist, national character, performance and leadership engagement nationalism.

### 3.2 Description of Respondent Demographics

Based on the research data collected, the following is a demographic picture of 856 vocational teachers covering 34 provinces in Indonesia:

**Tabel 1 - Demographics by province.**

No	Province	Number of respondents in percent
1.	Bali	1.6 %
2.	Bangka Belitung	0.1 %
3.	Banten	5.1 %
4.	Bengkulu	0.5 %
5.	Yogyakarta	0.1 %
6.	Jakarta	6.2 %
7.	Gorontalo	1.2 %

**Tabel 1 - (Continue)**

No	Province	Number of respondents in percent
8.	Bali	1.6 %
9.	Bangka Belitung	0.1 %
10.	Banten	5.1 %
11.	Bengkulu	0.5 %
12.	Yogyakarta	0.1 %
13.	Jakarta	6.2 %
14.	Gorontalo	1.2 %
15.	Jambi	1.2 %
16.	West Java	16.7 %
17.	Central Java	16.9 %
18.	East Java	17.4%
19.	West Kalimantan	1.1 %
20.	South Kalimantan	1.9 %
21.	Central Kalimantan	3 %
22.	East Kalimantan	0.1 %
23.	North Kalimantan	0.5 %
24.	Riau Islands	4.8 %
25.	Lampung	0.7 %
26.	Maluku	0.9 %
27.	Nangroe Aceh Darussalam	2.6 %
28.	West Nusa Tenggara	2.1 %
29.	East Nusa Tenggara	1.4 %
30.	Papua	2.5 %
31.	West Papua	0.8 %
32.	Riau	4.1 %
33.	Central Sulawesi	0.7 %
34.	Southeast Sulawesi	0.2 %
35.	North Sulawesi	4 %
36.	West Sulawesi	0.8 %
37.	South Sulawesi	0.8 %
<b>Total</b>		<b>100 %</b>

**Tabel 2 - Demographics by gender.**

No	Gender	Number of respondents in percent
1.	Male	58.3 %
2.	Female	41.7 %
<b>Total</b>		<b>100 %</b>

**Tabel 3 - Demographics by classification of teachers.**

No	Classification of Teachers	Number of respondents in percent
1.	Government teachers	68.3 %
2.	Foundation Permanent Teachers	13.7 %
3.	Non-Permanent Teachers	18 %
<b>Total</b>		<b>100 %</b>

**Tabel 4 - Demographics by teacher certification.**

No	Gender	Number of respondents in percent
1.	Teachers who have certification	71.6 %
2.	Teachers who don't have certification	28.4 %
<b>Total</b>		<b>100 %</b>

**Tabel 5 - Demographics by age.**

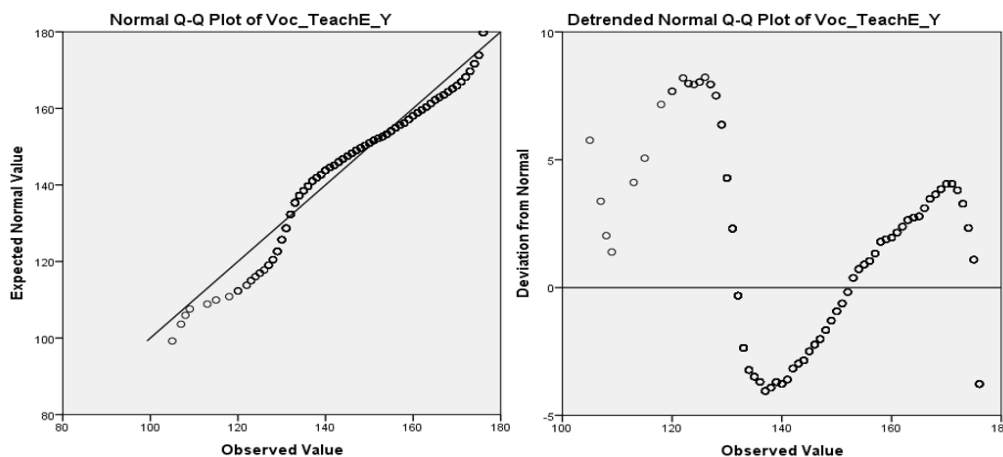
No	Gender	Number of respondents in percent
1.	<5 years	10.5 %
2.	5-10 years	16 %
3.	11-20 years	30.3 %
4.	41-50 years	43.2 %
<b>Total</b>		<b>100 %</b>

**Tabel 6 - Demographics by teaching time.**

No	Gender	Number of respondents in percent
5.	<30 years	11.6 %
6.	30-40 years	24.9 %
7.	41-50 years	28.5 %
8.	41-50 years	35 %
<b>Total</b>		<b>100 %</b>

### 3.3 Test the normality of the Indonesian Vocational Teacher Engagement Variable (Voc\_TeachE\_Y)

Data normality test was conducted to test the Indonesian Vocational Teacher Engagement variable as an endogenous variable consisting of the dimensions of Positive Psychology (X1), Positive Education (X2), Teacher Performance (X3), Nation Character (X4), Nationalism Leadership Engagement (X5), Teacher Competencies (X6). Normality test is done by Proportion Estimation through the Bloom Formula with the Q-Q Plot approach. The Q-Q plot approach was taken because the number of study samples > 200 vocational teachers. Based on the calculation results of the Normal Q-Q plot, the variable I-Vocatie has a normal distribution, and the data distribution has no outliers. Likewise, if seen from the Detrended Normal Q-Q plot, the data distribution does not represent the sine or cosine curves. So it can be concluded that the distribution of variable I-Vocatie data is normally distributed. Graphically the results can be seen as in Figure 1.



Information  
 Voc\_TeachE\_Y: Indonesian Vocational Teacher Engagement (I-Vocatie)

**Fig. 1 - Indonesian Vocational Teacher Engagement Variable normality test results with Q-Q plot**

### 3.4 Test the linearity of the line relationships of each endogenous variable with the Indonesian Vocational Teacher Engagement variable (Voc\_TeachE\_Y)

The results of the linearity test summary are the dimensions of Positive Psychology (Positive\_Psy\_X1), Positive Education (Positive\_Edu\_X2), Teacher Performance (Performance\_X3), Nation Character (Nat\_Char\_X4), Nationalism Leadership Engagement (Lead\_Engage\_X5), and Teacher Competences (Competence\_X6) with I-VocationalE (Vocational) as endogenous variables can be seen in Table 1 below.

**Table 7 - Recapitulation of the linearity test of the line relationship between each exogenous variable with I-Vocatie (Voc\_TeachE\_Y) through the deviation from linearity test.**

Number	Linearity (Voc_TeachE_Y) from Exogenous Variables	Deviation from Linearity		F from 11 Curve's Estimation	Sig	Remarks
		F	Sig.			
1.	Positive_Psy_X1 → Voc_TeachE_Y	5.531	0.000	1648.562	0.000	Linear
2.	Positive_Edu_X2 → Voc_TeachE_Y	4.466	0.000	2959.690	0.000	Linear
3.	Performance_X3 → Voc_TeachE_Y	4.398	0.000	3883.888	0.000	Linear
4.	Nat_Char_X4 → Voc_TeachE_Y	3.742	0.000	5457.319	0.000	Linear
5.	Lead_Engage_X5 → Voc_TeachE_Y	1.579	0.085	-	-	Linear
6.	Competence_X6 → Voc_TeachE_Y	3.744	0.000	2738.719	0.000	Linear

#### Description

Voc_TeachE_Y	: Indonesian Vocational Teacher Engagement (I-Vocatie)
Positive_Psy_X1	: Positive Psychology Dimension
Positive_Edu_X2	: Positive Education Dimension
Performance_X3	: Teacher Performance Dimension
Nat_Char_X4	: Nation Character Dimension
Lead_Angage_X5	: National Leadership Engagement Dimension
Competence_X6	: teacher Competences Dimension

Based on Table 7 above, it was found that all line relationships between exogenous variables include Positive Psychology (Positive\_Psy\_X1), Positive Education (Positive\_Edu\_X2), Teacher Performance (Performance\_X3), Nation Character (Nat\_Char\_X4), Nationalism Leadership Engagement (Lead\_Engage\_X5), and Teacher Competences (Performance\_X3), Nation Character (Nat\_Char\_X4) Competence\_X6), where I-Vocatie (Voc\_TeachE\_Y) as endogenous variable is linear.

### 3.5 First Research Result

In proving the tendency of vocational teacher engagement conditions in Indonesia (Voc\_TeachE\_Y), researchers first determined 7 (seven) categories of vocational teacher engagement in Indonesia, namely categories: (1) the vocational teacher profession is not internalised within itself, eroded and shows apathetic self-attitude, (2) the profession as a vocational teacher frustrates him, (3) the vocational teacher profession is physically and psychologically exhausting, (4) independently, the vocational teacher is able to interpret his profession as a condition that must be unified in him, (5) the vocational teacher profession starts internalised and the profession as a teacher is an interesting thing to develop, (6) the vocational teacher profession is interpreted deeply in every aspect of life, and (7) the vocational teacher profession has been internalised as a shared value and stick to itself as a whole. The results of the analysis can be seen in the following Table 8.

**Table 8 - Summary of calculation of the tendency of Vocational Teacher Engagement Conditions in Indonesia (Voc\_TeachE\_Y) based on sample data through the confidence interval ( $\mu$ ) approach at the significance level  $\alpha < 0.05$ .**

95% Confidence Interval for Mean		Range (R)	Class Interval (i)	Conclusion
Lower Bound	Upper Bound			
3.3541	3.3677	71	11	The condition of vocational teachers in Indonesia tends to internalise itself and the teaching profession becomes an interesting thing to be developed significantly at $\alpha < 0.05$

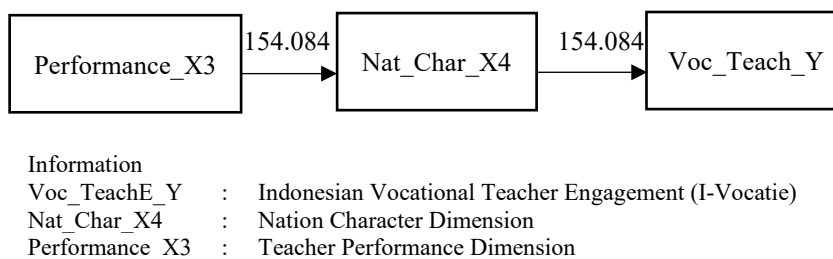
Information

Voc\_TeachE\_Y : Indonesian Vocational Teacher Engagement (I-Vocatie)

Based on Table 8, it can be concluded that vocational teachers in Indonesia tend to have internalised teacher professional status and the profession has become an interesting thing for teachers to develop significantly at  $\alpha < 0.05$ .

### 3.6 Second Research Result

The second research result is proven by the Binary Segmentation Analysis approach called Classification and Regression Trees. In this analysis, the researchers set a Pruning Depth of 2, Pruning Parent of 2, and Pruning Child of 1 with a significance level of  $\alpha < 0.05$ . Graphical summary of the results can be seen in Figure 2 below.



**Fig. 2 - Classification & regression trees results to determine the dimensions that most strongly determine the formation of vocational teacher engagement in Indonesia (Voc\_TeachE\_Y)**

Nation Character (Nat\_Char\_X4) is the most powerful dimension determining the formation of vocational teacher engagement in Indonesia. If the improvement of the nation character of vocational teachers is done through a priority program, the engagement of vocational teachers in Indonesia will increase by 154,084 times from the current engagement condition (Voc\_TeachE\_Y). While the nation character of the vocational teachers can be formed through the improvement of the teacher's performance (Performance\_X3) which will be able to improve the nation character of vocational teachers 38,004 times from the current condition

## 4. Discussion and Conclusion

The result showed that the nation character that is Indonesian character must be attached to every vocational teacher in Indonesia. This is in line with the condition of Indonesia, which is so vast in its territory, the diversity of regions, ethnicities, levels of progress and cultural characteristics varies greatly. Indonesian vocational teachers whose competencies are ready to meet with the industrial era 4.0 must first have an Indonesian setting that must be strong. Because of the new civilisation and movement to become advanced vocational education, a national agreement is needed first, and also an agreement that teachers must change into teachers who have Indonesian character.

Not a teacher whose character was formed by the advancement of industry 4.0 but was formed by Indonesian civilisation. Even though an Indonesian vocational school teacher is on duty in one area in the territory of Indonesia, the teacher should not think about his area of duty, but must always be oriented towards Indonesia as a whole. So the progress of the civilisation of the industrial revolution 4.0 is largely determined not because of the capacity of human resources

cognitively and skillfully, but very much determined by how strongly vocational teachers think of the growth of lulusan capacity to supply throughout Indonesia. In the findings of this study, even the performance of vocational teachers who will encourage the birth of teacher characters that reflect Indonesians.

Improving the teacher's national character will automatically be able to build and enhance the teacher's national character nationally. So that the achievement of quality education can be achieved and started from within the teacher. The results of this study are in line with research that found that nation character is proven to help increase teacher engagement through motivation both cognitive, emotional and social (Klassen et al., 2013). With the nation character of vocational teachers in Indonesia, the teacher will instil values through new knowledge to students (Gardee & Brodie, 2015). And through characters who think of disparity as a whole to one nation, the teacher will continue to innovate and update the methods applied based on the conditions of each regional difference (Burns, 2010).

In the end the management of Indonesian vocational teachers becomes crucial because it can increase the commitment of teachers in undergoing their profession (Wolf, 2011). Through I-VOCATIE, vocational teachers can conduct assessments so they can continue to improve and work independently to improve their competency to become competent teachers 4.0

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