The Challenge of Vocational High School Teachers in Indonesia

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Abstract—**Vocational high secondary school teachers need to update their knowledge to support their teaching and learning. This article aims to investigate the challenge of vocational secondary high school teacher in responding the development of information and communication technology (ICT) and the globalization era. A total of 51 teachers and novice teachers in Soloraya were enrolled in this study. The data were collected using questionnaire Likert scale that was downloaded and translated from a survey for measuring 21st century teaching and learning, West Virginia Department of Education. Regression analysis was used to analyze the significance of correlation between student's learning and teacher's statement. The finding indicated that there was no statistically significant correlation between student's learning and teacher's statement (F = .16, p > .05), there was no statistically significant the correlation between student's learning and teacher's statement on global connection (F = .16, p > .05), there was no statistically significant correlation between student's learning and teacher's statement on local connection (F = .65, p > .05), and there was no statistically significant correlation between student's learning and teacher's statement on using technology as a tool for learning (F = 1.36, p > .05). In addition, teachers are the major factor in learning process. They must update their knowledge of global connection, local connection and technology as a tool for learning. Teachers must have many designs of teaching. Students need practical experience in real work environment of global connection, local connection, and technology as a tool for learning. Learning by doing in the real work environment is more impression/ effective than just theoretical learning only.**

Keywords—learning competency; succeed learning; teachers' skills; update knowledge

I. INTRODUCTION

The structure of education system in Indonesia are national and non-formal education. National Education consists of seven types of education, namely, general education, vocational education, special education, in-service education, religious education, academic education, and professional education. Non-formal education covers equivalent school of primary, junior secondary, and senior secondary school (package A, B, and C) [1].

Vocational schools are preparing students to be master in technical or vocational skills for work. Critics come to the vocational schools because of teaching and learning in vocational schools did not match with the need of industry. Vocational students are incapable of current technology and innovation. They are weak in mathematics, English, and computing. The critics are stated by employer/employee who felt that the curriculum in vocational senior secondary school was misleading with industrial needs [2]. A number of the lesson that has to be learned by students is very wide of group dimension. Kurnia et al. argued the competency standards for primary and secondary students including vocational students are grouped into three dimensions, namely, attitude, knowledge, and skills [3]. The cores of competency for general and vocational teachers are pedagogic, personal, social, and professional. Teachers and students have to know many aspects of knowledge and skills. Teachers will not have time to improve themselves or to update a new technology and innovation if there are so many aspect they have to learn. Vocational teachers who have working experience could share their knowledge to encourage vocational students. On the other side, teachers who have multiple certifications would not effective in improving the skills of vocational students. Teacher needs the real practice in the global/local connection and technology that makes them have the experience in it. Students would have a high passion to understand the lesson based on teachers' experience and explanation [4]. Mastering learning design and learning experience could be considered in the performance of vocational high school teachers.

II. LITERATURE REVIEW

A. Vocational High Secondary School Teachers in Indonesia

The teacher of vocational senior secondary school in Indonesia has been increased in the last five years. In 2011, the total teacher were 164,074 and in 2015 it increased to 346,678 teachers. The number of students of vocational senior secondary school is also increase. In 2011 total students were 4,019,157 and in 2015 it increased to 4,211,245 students [5]. The increasing number of students was not as fast as the increasing number of teachers (4.78% versus 111.29%). On the other side, Indonesia has 374 teacher training institute including 32 public institute and 342 private institute. The large number of teacher institutions makes uncontrolled number of students who enroll in the teacher training institutions. This condition encouraged policy makers in Indonesia to seriously handle and manage a large number of vocational teachers. The

government issued a regulation relating to teacher competencies to ensure the quality of teaching and learning process in teacher institutions. The regulation contained two programs: pre-service teacher training and in-service teacher training. The regulation is applied to all teacher in senior high school level.

B. *Vocational High Secondary School Development*

Pre-service teacher program is "workshop in developing learning media, teaching practice through micro teaching, peer teaching, and subject achievement program" [6] which be held one-year field-based postgraduate teacher professional development program to ensure novice teachers have pedagogical knowledge. Started from system selection procedure, candidate teachers must have a high level of literacy and numeracy, strong interpersonal and communication skills, a willingness to learn, and high motivation to teach. This set of characteristics is assumed to be an effective teachers [2]. The participants of this program are bachelor degree in education who are linear/allied to teacher professional development program with/without matriculation, bachelor in Psychology or 4 degrees diploma from non-education with additional matriculation program.

In-service teacher program is teachers' certification and teachers' competency test (Uji Kompetensi Guru or UKG). The first batch of the certification is conducted in 2007; more than 200.000 incumbent teachers were involved [7]. Teachers are required to collect portfolio preparing to take 90-day course. The portfolios can be used to help teachers to improve their practice [2]. Of the 2.7 million teachers (one-fourth are private teachers) only 35% met the certification requirement based on the 2005 law of teacher and lecture. The government predicted ten years to upgrade the incumbent teachers [7]. On the other hand, UKG has started 2012. This program aims to assess the level of competence of each teacher and teachers' mastery mapping in pedagogical and professional competencies. UKG is conducted every year to assess the teachers' professionalism in academic field. The minimum academic qualification for a teacher is a bachelor or 4-degree diploma who has four teachers' competency standards, namely: pedagogical, personal, social, and professional. Teachers must take the test to find the weaknesses or problems in mastering pedagogical and professional competencies.

The programs of pre-service teacher and in-service teacher aim to improve the teachers' competencies and skills in teaching-learning process. A good learning process would be assumed a good result of learning, it could affect a good competency of learning outcomes. Furthermore, the government expects the linkages and compatibility between student competencies and industrial job vacancies. After graduation the students will not wait for a long time to find a job.

III. METHODS

The present study used a quantitative approach of correlation design to investigate whether the student's learning significantly correlates to the teacher's statement. This study took place in Soloraya, Indonesia which consisted of five

districts: Klaten, Karanganyar, Boyolali, Sukoharjo, and Surakarta. 51 teachers and novice teachers in Soloraya participated as intact groups in this study. The questionnaire was downloaded and translated into Indonesian from a survey to measure 21st century teaching and learning, West Virginia Department of Education [8]. The data were collected using Likert scale questionnaire (5 scales). All question items (28 in total) were comprised from three dimensions, namely global communication (6 items of student's learning and 3 items of teacher's statement), local connection (5 items of student's learning and 3 items of teacher's statement), using technology as a tool for learning (8 items of student's learning and 3 items of teacher's statement). In this study, regression analysis was used to test the significance of data correlations between student's learning (independent variable) and teacher's statement (dependent variable). Student's learning means how often teacher have asked students to do activities to support the target class of learning (global connection, local connection, and using technology as a tool for learning), and teacher's statement means what extent teachers do agree with statements about a target class of learning.

IV. RESULTS

A. *Descriptive Statistics*

Initially, the analysis of normal distribution was run on the residual scores achieved by the 55 participants. After extreme scores (i.e. outliers) on the residual were deleted to meet the normal distribution tests, the total number of participants in this study was 51 teachers and novice teachers. The descriptive statistics and all statistical tests were performed on a sample of N = 51. The summary of descriptive statistics of the participants is provided in table 1 and the summary of normal distribution is provided in table 2.

TABLE I.   DESCRIPTIVE STATISTICS OF PARTICIPANTS

	Participants	**N**	**Min-max**	**Mean**	**SD**
Gender	Male Female	17 34			
Teacher's work place (regency)	Boyolali Karanganyar Klaten Sukoharjo Surakarta	4 3 3 6 35			
Teaching experience	< 1 year 1-5 year 11-15 year >15 year	35 10 3 3			

Global connection
  Dependent Variable
  Independent variable
		51
		51
			6-12
			6-21
				8.94
				13.78
					1.72
					4.46

Local connection
  Dependent Variable
  Independent variable
		51
		51
			6-14
			9-25
				9.29
				16.69
					1.88
					4.64

Technology as a tool for learning
  Dependent Variable
  Independent variable
  Student's learning
  Teacher's statement
		51
		51
		51
		51
			6-15
			11-40
			33-82
			19-39
				11.33
				30.55
				61.02
				29.57
					2.26
					7.35
					12.46
					4.53

TABLE II. KOLMOGOROV-SMIRNOV TEST

Variable	Statistics	df	P
Residual of global connection	.121	51	.06
Residual of local connection	.110	51	.17
Residual of technology as a tool for teaching	.122	51	.06
Residual of teacher statement	.103	51	.20

Note. All residual variables are normally distributed data ($p > .05$)

The results of the linearity test of between dependent and independent variables are presented in table 3. The significance of linearity can be seen through the p value. Table 3 shows the lowest probability is .07, and all the *p* values are more than .05. As a result, the null hypothesis that between variables are linear should be accepted, which means that regression analysis can be conducted.

TABLE III. LINEARITY TEST

Variable	F	df	P
Teacher statement * student learning on global connection	.17	1, 11	.69
Teacher statement * student learning on local connection	1.31	1, 11	.26
Teacher statement * student learning on technology as a tool for teaching	3.59	1, 14	.07
Teacher statement * student learning	1.21	1, 21	.28

Note. All variables are linearity distributed data ($p > .05$)

B. The Correlation Between Dependent and Independent Variable

Regression analysis was run to investigate whether there was any correlation between students' learning and teacher's statement. The investigation was conducted in the three dimension variables: global connection, local connection, and using technology as a tool for learning, and the total of the three dimensions. Table 4 reveals the correlation of student's learning and teacher's statement on global connection was not statistically significant ($F = .16$, $p > .05$), the correlation of student's learning and teacher's statement on local connection was not statistically significant ($F = .65$, $p > .05$), the correlation of student's learning and teacher's statement on using technology as a tool for learning was not statistically significant ($F = 1.36$, $p > .05$), and the correlation of student's learning and teacher's statement was not statistically significant ($F = .16, p > .05$).

TABLE IV. RESULTS OF REGRESSION ANALYSES

Variable	t	p	β	F	df	p	Adj. R^2
Student's learning * Teacher's statement on global connection	-.40	.69	-.02	.16	1, 49	.69	-.02
Student's learning * Teacher's statement on local connection	.80	.43	.05	.65	1, 49	.43	-.01
Student's learning * Teacher's statement on technology as a tool for teaching	1.17	.25	.05	1.36	1, 49	.25	.01
Student's learning * * Teacher's statement	.97	.34	.05	.94	1, 49	.34	-.01

Note. The dependent variable for all regression was teacher's statement.

V. DISCUSSION

The finding of this study (see table 4) indicated that the student's learning and teacher's statement did not have a significant correlation. It means teachers have asked students to do activities to support the target class of learning (global connection, local connection, and using technology as a tool for learning) but they did not agree with statements about what they have done to support the target class of learning, and or vice versa.

Teacher is the major factor of learning process. Teaching and learning process is influenced by "teachers' didactics"," content structure of the course"," desire to learn the subject", and "library equipped with an extensive collection of books and appropriate facilities" [9]. Teachers' didactics relates with the teacher handling the class and providing the learning environment, content structure of the course is the content of learning materials, desire to learn means the personal motivation for learning, and library equipped with extensive collection is the reference for learning. Interaction of the educational factors will get good learning outcomes. The four factors are explored in four dimensions: institution, teacher, student, and curricula. Institution must ensure that the process of teaching and learning runs well, teachers in the school have good competencies, students have high enthusiasm, and the curricula is in line with the industrial requirement.

A. Institutions

Indonesia has 128 Vocational Education and Training (VET) programs registered on 3 national boards governing the accreditation of vocational education [2]. The Ministry of Education and Culture issued detailed competency and curriculum for Vocational High Secondary School *(Sekolah Menengah Kejuruan* called *SMK*). The national council for accreditation has three ways to conduct certification, they are through professional associations, industry certification/ second parties, and certifications provided by schools in collaboration with industry/ first parties. During studying at SMK for three years, students will be accessed 24 skills. Industry, as school's partner, has the opportunity to access students' competencies.

B. Teachers

Teacher is a professional job and it cannot be combined with another job [10]. Sappa et al. argued that combining teaching with another job will decrease teachers' perception of professional teachers. Many factors influence the teacher's job. Andersson, and Köpsén stated that most of the Swedish vocational school teachers spent their time in the teaching process at school [11]. The teacher's demographics e.g. age, vocational area, and geographic area affect teacher's performance. There is no single factor can encourage the teachers' work. Berger and Ascoli investigated five factors of Swiss vocational educational training teachers (VET) related with the motivation: heterogeneity, socio-demographic, antecedent socialization, beliefs of occupation, and satisfaction [12]. There is no a single motivational factor that has a significant difference. So, it would be better for VET educators to be driven by a lot of motivations.

Teacher needs knowledge, Sirk, et al. argued that the changes of society in Estonia require vocational education and teacher's capabilities training [13]. Professional teachers required a certain characteristic and long list of knowledge. For example, teachers must have internal motivation, positive thinking, personal commitment, mission, using equipment, time management, foreign languages and so forth.

On the other side, social communication and technology support teachers' performance. Tafel-Viia et al. stated that social innovation supports teachers' perception forward the change in vocational school and higher education reform [14]. This network is a bridge-builder between changes in regulatory, normative and cultural-cognitive institutions. The same statement also declared by Jossberger that top-down innovation influences teachers practice in vocational school [15]. Applying technology in education needs a proper strategy. Knowledge and experience support the innovation of education. Khan, and Markauskaite defined two strategies of vocational school teachers in implementing information communication technology (ICT)-enhanced, namely orientations and intentions [16]. In the orientations strategy, the teacher focuses on information-oriented, feedback-oriented, practice-oriented, facilitation-oriented, and industry-oriented approaches. In intentions, teacher considers on effectively delivering subject contents, achieving desired course outcomes, linking theoretical and practical knowledge, providing opportunities for active learning to develop students' understanding, and developing students' knowledge and skills to meet industry's requirement. Technological knowledge will be more understood better in pragmatic learning. The teacher will be inspired to be master during the pragmatic learning. Kuhn et al. argued that the contents of pedagogical knowledge for pre- and in-service teachers in business and economics of vocational school using video and performance-based assessment are valid and reliable tools [17]. The contents covering knowledge of teaching objectives, content, and methods are similar to other domains. The comprehensive theoretical model is similar with the characteristics of other cognitive structure, e.g. propositional, case, and strategic knowledge.

C. Students

Talking about students cannot be separated from their community group and their environment. They have a community based on their hobby, skill, facility, or other things that make them happy together. Boersma et al. stated that learners' community can optimize the learning environment that involves students' experience in sharing, which is meaningful, reflective and transfer-oriented [18]. Sharing experiences in learning is related to the feeling of joining a group. Impressive learning will stimulate students to interact in the activities of the vocational school, reflective learning refers to the recognition of specific concepts and its processes, and the transfer of learning means comparing and distinguishing between practice and theory in the Vocational School.

On the other hand, global and local connection are needed by students to practice what they have learned. Students prefer practical learning rather than theoretical learning. In practical learning, students feel interested to learn. Fjellström stated that

Swedish vocational school students prefer to meet industry requirements rather than focus on learning goals [19]. The experience in practical learning creates a long memory in their mind. Moreover, the practical learning is related to the technology, students have a high passion to explore the technology. The curiosity that comes naturally makes them want to know more. New technologies inspire vocational students at various levels that enhance learning. Teacher-student interaction is the key into successful learning using technology and teacher's instructional activities as a trigger of learning [20,21].

D. Curricula

Vocational schools focus on four educational goals: preparing individual to work, developing capability, improve sustainable skills, and supporting occupation [22]. Vocational education is not enough to only be studied until senior secondary school or bachelor degree, it needs continual learning. Bruijn et al. explained the importance of lifelong learning in Netherland [23]. Lifelong learning is always needed because of the development of technology, labor's requirement, retirement, and training requirement. The lifelong learning cannot be fulfilled by professional and professional education institute, it requires a high personal motivation to learn. Furthermore, Bruijn et al. argued that the function of lifelong learning is training to improve career, to improve knowledge, and to plan the end of social culture and personal development [23].

On the other side, the content of learning should be synchronized between learning outcome and stakeholders. Ante stated that political scientists are concerned about education and make a consequence of skills that is influenced by a regime through industrial relations, vocational training and education, corporate governance, inter-firm relations, and the workforce [24]. So many courses have to be learned by students and it will not be effective to obtain a good learning outcome. Koopman stated learning with the content of characteristic will hamper students' development and students with the fewer characteristic of competence-based education will be slightly better improved [25]. The contents of characteristic learning is complicated and burdens learners. Li studied the curricula in Germany and China [26]. Curricula in Germany applies discipline oriented that guides the personal development in the future. Teachers understand the current situation and the need of secondary school students. In China, curricula are designed based on the situation of students and personal development. The teacher's understanding of the curriculum is closely related to the content of curriculum analysis. But in real practice, what teachers do is different from the content/ demands of the curriculum. In this study, curriculum should be related to the content of learning materials and learning design.

VI. CONCLUSION

Student's learning and teacher's statement do not have a significant correlation. Although teachers have asked students to do activities that support the target class of learning in global connection, local connection, and using technology as a tool

for learning but they did not support the target class of learning, and or vice versa.

The institution of vocational school prepares individual skills to work, develops personal capability, continues individual development, and supports occupational transition. The succeed of education is influenced by instruction process, learning contents, personal motivation, and learning facilities that supported by institutions, teachers, students, and curricula. Teachers are the major factor in learning process who need to update knowledge to cover the new technology and innovation, industrial requirements, labor market, and social communication. On the other side, policy makers should consider the teachers needs and the equipment's for education. The indicator of successful learning is the suitability of learning outcomes and the labor market. Students need practical experience in the real working environment or industry. Curriculum is an important factor in education and it would be better to focus on the contents than the wide range of learning subject.

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