



The Influence of Continuous Professional Development on the Vocational Teachers' Competence to Support the Professional Development of Learner Teachers

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Abstract. This study aims to analyze the influence of continuous professional development in supporting the professional development of learner teachers on the competence of VHST. To answer the problem, expose facto research was conducted. A sample of 99 productive VHST who took the teacher competency test in East Java is determined using a stratified random sampling technique. The data analysis technique is the descriptive analysis and Kruskal Wallis Test. The results showed: 1) showed there was a non-significant influence on the competence teachers in terms of: who often participated in the functional and technical teacher training compared who did not often take; often participated in the collective teacher activities compared to never taking; do not often participate in presentations in scientific forums compared to teachers who do not participate; teachers participating in publication of research results or innovative ideas in the field of formal education compared to teachers not following; teachers having appropriate technology publications compared to teachers not having, who are finding works of art compared to who are not finding, making learning tools/teaching aids and practical tools compared to teachers not making, and 2) There is a significant influence on the competence teachers who prepare textbook publication compared to teachers who do not prepare. The implications of the research results are expected to be input for related parties in improving the competence of VHST.

Keywords: Development · Professionalism · Sustainability · Teacher competence

1 Introduction

The principle of teacher professionalism has: talents, interests, vocations and ideals; commitment to improve the quality of education, faith, piety, and noble character; educational background and academic qualifications according to the field of works; competence according to the field of duty; responsibility for the implementation of professional duties; income according to work performance; opportunities for continuous professional development by lifelong learning; guarantee of legal protection in professional duties; professional organizations are authorized to regulate matters related to

professional duties [1]. Furthermore, professional competence means having a certificate of competence in the vocational field fostered because vocational high school (VHS) graduates are also required to take competency exams as needed.

Pedagogic competence is related to the teachers understanding of students, designing, implementing learning, evaluating learning outcomes, and developing students to actualize their various potentials. Personal competence and ability reflect a steady personality; wise, stable, mature, noble, and authoritative can be an example. Social competence inoffensively communicates and associates with students, staff, fellow educators, parents, and the surrounding community. Professional competence, broad, deep mastery of subject matter, mastery of scientific structures and methodologies.

Professional development of teachers is one of the influence methods to improve the quality and practice of learning and student learning [2, 3]. Factors that affect teacher performance include training and development of teacher resources that are carried out well [4, 5]. Updating the competence of vocational school teachers can be done through continuous professional development (CPD) so that it can support the development of the learning teacher profession (DLTP) carried out as needed, gradually and continuously improving professionalism and having an impact on developing their careers.

CPD, equipped with modern technology, promises quality educational outcomes, social welfare, teacher pedagogical skills and student learning [6]. The study [7] results show that consistent motivational encouragement in CPD activities is very important and has a positive influence on vocational teachers. CPD has an influence on planning for the future and determining professional development [8]. Traditional professional development can also be done through motivational discussions at the beginning of the year [9], short workshops [9, 10], bringing in experts from outside [9], and skills training [11].

2 CPD Elements

Elements of CPD activities in support of DLTP [12] include self-development, scientific publications, and innovative works.

2.1 Self Development

This activity is in the form of functional and technical teacher training (FTTT) and collective teacher activities (CTA). FTTT activities are to improve teacher competence, and strengthen insight, knowledge, attitudes, values, and skills according to the profession, to be used by teachers in carrying out their duties. Technical training includes training, upgrading, career guidance, technical guidance, courses, internships or other forms recognized by the competent authority.

The study's results revealed a positive and significant relationship between training and teacher professionalism. The primary need for teacher professional development is basic concept training and application of character building, bilingual, ICT-based learning, and how to carry out classroom action research (CAR) [13]. Education and training positively and significantly affect professional competence and teacher performance [14]. There is a relationship between participation in development programs and

the professional performance of teachers [15]. There is a non-significant influence on the competence of VHST in terms of the length of time they have attended the training [5]. The results of the study [16] also prove that continuous training with modern technology helps increase the workforce, strengthens economic competitiveness in the era of globalization, results in quality education and promises social welfare.

The CTA that can be followed in CPD to support DLTP includes subject teacher deliberations or teacher professional organizations. Another CTA is seminars, workshops, colloquiums, panel discussions, in-house training or other scientific meetings, and other collective activities according to the duties and obligations of professional teachers.

2.2 Innovative Works

Innovative works of appropriate technology publications (ATP), finding works of art (FWA); making learning tools/teaching aids and practical tools (TAP).

The results of the study [17] showed that there was no significant influence competency of VHST in terms of the number of books/modules/dictations written by the teacher, development of appropriate technology, works of art, development of learning media/tools, and organizational management activities and additional tasks.

Research hypotheses: 1) there is no influence or difference in the competence of VHST in terms of FTTT to support DLTP, 2) there is no influence on VHST competence in terms of CTA to support DLTP, 3) there is no influence on VHST competence in terms of PSF to support DLTP, 4) there is no influence on the competence of vocational teachers in terms of PRFE to support DLTP, 5) there is no competence of vocational teachers in terms of TP to support DLTP, 6) there is no influence of competence of vocational teachers in terms of ATP to support DLTP, 7) there is no influence of competence VHST are viewed from FWA to support DLTP, 8) there is no influence on VHST competence in terms of TAP to support DLTP.

3 Methods

This study aims to analyze the influence of CPD implementation in supporting DLTP on the competence of VHST. This type of research is exposed facto. Data analysis using descriptive analysis techniques and two-way ANOVA inferential statistical analysis, preceded by prerequisite tests.

The population of teachers is all vocational teachers of State and Private Vocational Schools in East Java who have participated in teacher competency test (TCT). The number of selected teacher samples is 99 VHST who teach in 13 VHST. Determination of the sample of teachers using random sampling technique, calculated by the following formula.

$$n = \frac{NZ^2s^2}{Nd^2 + Z^2s^2} \quad (1)$$

n is the sample size, N population, and sample Z is Z score according to the significance level, s is variance, and d is reliability.

Table 1. Teacher competencies related to CPD activities

Tot FTTT	N	Tot TP	N
0,00	6	0,00	78
1,00	17	1,00	13
2,00	28	2,00	5
3,00	15	3,00	2
4,00	17	5,00	1
5,00	16		
Total	99	Total	99
Tot CTA	N	Tot ATP	N
0,00	24	0,00	84
2,00	17	2,00	2
3,00	13	3,00	2
4,00	3	5,00	2
5,00	5		
Total	99	Total	99
Tot PSF	N	Tot FWA	N
0,00	89	0,00	97
1,00	5	1,00	1
2,00	3	2,00	1
3,00	1		
4,00	1		
Total	99	Total	99
Tot PRFE	N	Tot TAP	N
0,00	82	0,00	69
1,00	14	1,00	10
2,00	3	2,00	13
		3,00	3
		4,00	2
		5,00	2
Total	99	Total	99

Documentation techniques obtained research data through document review. Documentation of research data is available, completed and updated by providing a questionnaire filled out by the teacher according to the latest availability.

Teacher competency data based on TCT results documentation for 2012–2020. Data on the implementation of CPD consists of self-development, scientific publications, and

innovative works to support DLTP. The instrument for collecting teacher competency data is in the form of a data tabulation sheet on the results of TCT productive teachers in VHS. Before the instrument is used, the validity test is carried out, the results are very valid.

The data obtained were described by tabulating according to variables with the help of the SPSS computer program. The determination of the number of interval classes refers to the Sturges rule [19]. The analysis technique is hypothesis testing with two-way ANOVA after the parametric assumption test is fulfilled: a) the sample comes from a normally distributed population, b) the value of variance in a homogeneous sample group, c) interval and ratio scale data, and d) the sample is taken randomly [20]. The decision states the normality of the distribution and the homogeneity of the variance, and the hypothesis test is based on an error rate of 5%.

4 Results and Discussion

The competence of VHST is related to CPD in supporting DLTP in Table 1.

Out of 99 teachers, 28 attended the FTTT twice, 17 attended once and four times, and 16 attended five times, 2) out of 99 teachers, 27 attended the CTA once, 27 attended twice, 13 attended three times, 3 attended four times, 9 attended five times, and 24 had never attended, 3) of 99 teachers, 89 had not attended PSF and 10 had attended (5 attended once, 3 attended twice, and 2 attended once), 4) out of 99 teachers, 82 have never implemented it, 14 have implemented it once and 2 three times, 5) of 99 teachers, 13 each one textbook publication (TP), 5 compiled two, 3 compiled one, and 78 teachers had not compiled, 6) of 99 teachers, 84 did not have ATP, 9 have one, 2 have two ATP o, 2 have three, 5 have two.7) out of 99 teachers, only 2 FWA teachers (one FWA and two FWA teachers each), 8) of 99 teachers, 30 make 10 TAP made one, 13 made two, 3 made three, 4 made two, and 5 made two, the remaining 69 teachers have not made. The results of the test for the normality of the data distribution are in Table 2. The normal distribution of the data for FTTT, CTA, PSF, PRFE, TP, ATP, FWA, and TAP all have Sig. $0.000 < 0.05$ so it is stated that the data distribution is not normal.

The results of the homogeneity of variance test in Table 3, only PRFE data has a Sig value of $0.027 < 0.05$ so it is declared not homogeneous. For FWA data, it has a Sig NA value.

Because the test requirements for normality of distribution and homogeneity are not all met, the hypothesis test procedure uses nonparametric statistics (Kruskal Wallis Test). A summary of the results of hypothesis testing is shown in Table 4.

Table 2. Data distribution normality test

Tot FTTT	Kolmogorov-Smirnov		
	Statistic	Df	Sig.
FTTT	0,191	99	0,000
CTA	0,198	99	0,000
PSF	0,513	99	0,000
PRFE	0,494	99	0,000
TP	0,452	99	0,000
ATP	0,478	99	0,000
FWA	0,534	99	0,000
TAP	0,406	99	0,000

Table 3. Data variance normality test

Data	Levine Statistic	Df1	Df2	Sig.
FTTT	1,046	5	93	0,395
CTA	1,573	5	93	0,175
PSF	0,725	2	94	0,487
PRFE	3,739	2	96	0,027
TP	0,884	3	94	0,452

Table 4. Results of Hypothesis testing

Hypothesis	Test Statistics Competence VHST		
	Df	Chi-Square	Asymp. Sig.
FTTT	5	3.076	0.688
CTA	5	2.999	0.700
PSF	4	0.960	0.960
PRFE	2	1.535	0.464
TP	4	9.646	0.046
ATP	4	3.302	0.509
FWA	2	1.906	0.386
APP	5	5.065	0.408

Of the 99 teachers, 28 (28.283%) followed twice, 17 (17.172%) one and four times, 16 (16.162%) five times. This data shows that the frequency of teachers participating

in the FTTT is relatively small, especially compared to the number of Government Employees VHS teacher teaching in VHS throughout East Java, which number 12.025 [21]. This result is supported by research [2] that CPD certified teachers in VHS teachers through self-development are in the low category 61.99%, medium 26.49%, and high 11.62%.

Teachers don't often take part in the FTTT based on written results because opportunities are limited, and teachers rely more on government-organized education and training, even though the number of training programs every year is decreasing.

Based on hypothesis testing, the value of Chi-Square = 3.076, Df = 5, Asymp. Sig = 0.688. These results indicate that there is a non-significant influence on the competence of VHS teachers who often have FTTT compared to teachers who do not often FTTT. The competence of teachers who have participated in the FTTT is an average of 60.444 (enough category) [19]. The reason VHS teachers' competence is only in the sufficient category because the percentage of teachers who have FTTT is very little compared to teachers who do not have FTTT. These results are supported by research [4] that the professional development of teachers in the category is quite influenceive, and there is a non-significant influence on the competence of VHS teachers in terms of the length of training time [5].

There is no significant competency of VHS teachers who have FTTT compared to those who have not FTTT because teachers in FTTT have low motivation, are not serious, the pattern of recruitment of participants is not good. The motivation and improvement of teacher competence in participating in m-learning training and workshops is in the sufficient category [23]. Another cause of FTTT is less than optimal in the use of modern technology equipment, and is not sustainable. In fact, continuous professional development programs equipped with modern technology can also promise quality educational outcomes [16].

Of the 99 VHS teachers, teachers have attended the CTA 27 (27.272%) once, 27 (27.272) attended twice, 13 (13.131%) participated three times, 3 (3.030%) attended four times, and 9 (9.090%) attended five times. This category figure is quite large because only 24 (24.242%) teachers have never participated in the CTA. This result is supported by research [22] that most teachers are certified educators who sometimes do CTA.

The results of hypothesis testing Chi-Square value = 2.999, Df = 5; asymp. Sig = 0.700. These results indicate a non-significant influence of the competence of VHS teachers who often follow the CTA compared to teachers who do not often follow the CTA. The teacher competency average of 60.444 is also only in the sufficient category. These results are supported by research [17] that there is a positive and significant relationship between teacher participation in subject teacher conference and teacher professional competence. A relationship exists between participation in development programs and teacher professional performance [15].

The low participation of VHS teachers in CPD is because they think their teaching is better than before attending STC and participants believe their participation has no impact on student learning outcomes [24]. The model in the teacher community is individualistic; training is only basic and requires discipline, especially for older teachers [25]. This condition certainly requires policies from stakeholders, especially in providing opportunities for CTA and improving the influenceiveness of the VHS teachers STC.

Of the 99 teachers, only 10 (10.101%) have participated in PSF. This result shows that PSF is still seen as something that is difficult for VHS teachers to follow and the percentage is very small. The percentage is low and the competence of VHS teachers is an average of 60.444 in the sufficient category [19].

Based on the written answer, the teacher stated that the cause of the low frequency of teachers doing PSF was the teacher's negative perception that doing PSF was difficult, low motivation, not used to doing PSF, lack of coaching patterns, and limited scientific forums that were easily accessible to teachers.

From the results of hypothesis testing the value of Chi-Square = 0.629; Df = 4; Asymp value. Sig = 0.960. These results show that there is no significant influence on the competence of VHS teachers who do not often participate in PSF and teachers never participate in PSF. These results are supported by research [22] that participation and participation status in scientific forums have no significant influence on teacher competence.

VHS teachers' competence has a non-significant influence because the percentage of teachers who follow PSF is tiny compared to teachers who have never had PSF. The results of this study are supported by research [18] that there is a positive and significant relationship between participation in scientific forums with teacher performance. This condition immediately requires serious, structured, and careful handling.

Of the 99 teachers, 82 (82.828%) have not done PRFE, 14 (14.141%) have done PRFE once and 3 (3.030%) PRFE three times. This data shows that PRFE is still seen as something that is difficult to do and follow, so the percentage of teachers doing PRFE is very small. This result is supported by research [22] that most teachers are certified educators only occasionally conduct research.

The results of hypothesis testing Chi-Square value = 1.535; Df = 2; asymp. Sig = 0.46 means that there is no significant influence between teachers who do not often follow PRFE and teachers who never take PRFE. These results are supported [17] that teacher competence in terms of the frequency of writing scientific articles has no significant influence on the competence of VHC teachers.

The low participation of teachers in PRFE is because teachers do it only for promotions, certification, competitions, or when there is research funding. If referring to [26] strategies in carrying out teacher professional development in China, teachers use reflective learning for their professional development by using themselves as a resource, teachers focus on teaching tasks, and are aware of actions before, during, and after teaching. The fostering of classroom innovative action research (CIAR) has become an influenceive national teacher professional development program [27].

Of the 99 teachers, 78 (78.788%) did not prepare TP, 21 (21.212%) composed 26 TB. This data shows that the number of teachers preparing TP is small. The average competency of TP teachers is 60.444 in the sufficient category [17]. This result is supported by research [22] that most teachers certified educators only occasionally carry out writing activities which are published in the form of books, modules, manuals, and the like.

The results of hypothesis testing Chi-Square value = 9.676; Df = 4; asymp. Sig = 0.046. This means that there is a significant influence on the competence of teachers in VHS teachers who compose TP compared to teachers who do not prepare TP. This result is supported by research that the One Book One Teacher program significantly

encourages teachers to be active in writing textbooks and makes them as productive textbook writers so that their professional competence is higher [28].

The number of TP teachers has little significant influence on teacher competence. Because of the preparation of the TP the teacher begins to study the content, read the material, see the pictures, write and make pictures, and check and correct until the TP is compiled. Teachers who have prepared TP also understand that writing competence is one of the fundamental demands for teachers in carrying out their profession as educators.

Based on some of the descriptions above, it shows a significant influence on the competence of VHS teachers who prepare TP compared to teachers who do not prepare TP. Therefore, to motivate teachers to start preparing TP, institutional support and a big movement are needed so that teachers immediately have ideas, materials, and opportunities, and there needs to be a workload reduction policy.

Of the 99 teachers, 84 (84.848%) did not have ATP, and 15 (15.152%) had ATP. This data shows that only very few teachers have ATP and the average teacher competence is 60,444 in the low category. The results of this study are supported by research [22] which proves that the CPD of certified educators, when viewed from the innovative work of ATP either independently, in groups, or institutionally is still relatively low.

From the results of hypothesis testing, the results obtained are Chi-Square = 3.302; Df = 4; and Asymp. Sig = 0.509. These results indicate that there is a non-significant influence on the competence of VHS teachers who have ATP compared to teachers who do not have ATP.

The low number of teachers making ATP in the form of media or computer-based interactive teaching materials: 1) some teachers prefer to use media from industry or download and adjust teaching time, 2) unpreparedness to develop teaching materials, 3) teacher limitations, 4) limited materials and infrastructure, 5) increase the busyness of arranging practical tools/materials to suit the time and number of students [29]. In addition, innovation development is a complex and iterative process, especially social factors [30]. Other causes are low motivation, limited ideas and materials, limited opportunities to start compiling ATP, and lack of institutional support so that policy breakthrough are needed from the leadership.

The number of teachers of VHS teacher FWA 2 (2.020%) out of 99 teachers, the details are 1 teacher of one FWA and one teacher of two FWA. These results indicate that the FWA teacher is still shallow and the average competence is 60,444.

The results of hypothesis testing Chi-Square value = 1.906; Df = 2; asymp. Sig = 0.386. These results indicate that there is a non-significant influence of teachers who are FWA compared to teachers who are not FWA. These results supported research [22, 31] that the innovative work of FWA teachers is low.

The influence of vocational teacher competence is only non-significant because the percentage of FWA teachers is very small. The low level of FWA teachers based on written teacher input is because only a small number of teachers have interests and talents in the arts and most VHS teachers still have an understanding of art, not part of professional development. Making art is only seen as a complement or entertainment, and the development of works of art in schools is more focused on students because of the many competitions on the agenda or as performers for students to participate in.

Of the 99 VHS teachers, 30 (30.303%) made TAP with details of 10 teachers making one TAP, 13 making two TAP, 4 making three TAP, 4 making two TAP, and 5 teachers making two TAP. This data shows that relatively few VHS teachers make TAP, and the average teacher competence is 60.444. These results are also supported by research [22] that the innovative work of teachers in making/modifying learning tools is low,

The results of hypothesis testing Chi-Square value = 5.065; Df = 5; asymp. Sig = 0.408. These results indicate that there is a non-significant influence of vocational teacher competence between teachers who make and do not make TAP.

The low participation of teachers in making TAP according to the teacher's written form is because teaching by making media or TAP requires preparation, the teacher has been busy writing teaching preparations, the teaching schedule is tight, family problems at home and other tasks, so there is no opportunity to make TAP. The low participation of teachers in making/modifying TAP is also due to factors of satisfaction, organizational climate, and leadership [32]. This condition must certainly be a concern for the leadership of the education unit, the provincial education office, and the directorate of vocational secondary education.

5 Conclusion

Based on the results of the research, data analysis and discussion are concluded as follows. There is a non-significant influence on the competence of VHST participating in the FTTT compared to teachers who do not often follow the FTTT. There is a non-significant influence on the competence of VHST who often follow the CTA compared to teachers who have never participated in the CTA. There is a non-significant influence on the competence of VHST who do not often participate in PSF compared to teachers who do not participate in PSF. There is a non-significant influence on the competence of PRFE VHS teachers compared to non-PRFE teachers. There is a significant influence on the competence of VHST in preparing TP compared to teachers who do not prepare TP. There is a non-significant influence on the competence of VHS teachers having ATP compared to teachers not having ATP. There is a non-significant influence on the competence of FWA VHST compared to non FWA teachers. There is a non-significant influence on the competence of VHST who make/modify TAP compared to teachers who do not make TAP.

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