MALAYSIAN ONLINE JOURNAL OF EDUCATIONAL MANAGEMENT (MOJEM)

OCTOBER 2021, VOLUME 9, ISSUE 4, 32 - 52
E-ISSN NO: 2289 – 4489

THE EFFECTIVENESS OF PROFESSIONAL DEVELOPMENT MODEL IN ENHANCING TEACHERS' COMPETENCIES

Isnormaniza Ithnain[1] & Khaliza Saidin[2]

[1]
Kangar Vocational College,
Malaysia

[2]
School of Education,
Universiti Utara Malaysia,
Malaysia

Corresponding Author:
Kangar Vocational College,
Malaysia

E-mail:
isnormaniza@gmail.com

ABSTRACT

Competent teachers form the backbone of the effective teaching and learning. In Technical and Vocational Education and Training (TVET) context, effective teacher learning can ensure that teachers' knowledge and skills are at the required standards. This study focused on the relationship between professional development and vocational teacher competency. This study identified the elements of professional development that were key predictors of teacher competence. This study was used the questionnaire with items adapted from Characteristics of Effective Professional Development to measure the professional development of teachers, and from the Performance Standards of Education Officers to measure teacher competencies. This study was a cross-sectional survey involving 173 vocational school teachers selected through the multi-level sampling in one of the states in Malaysia. The findings showed that there was no significant difference in teacher competence based on gender. However, there was a significant difference in teacher competence based on working experience. The findings also showed a significant positive correlation between professional development and teacher competence. Separate analysis of the professional development dimension showed the elements of active learning in the classroom, focus of teaching content, collective participation and coherent became predictors of teacher competence. The implications of this study show that effective professional development practices can enhance the competence of teachers in vocational colleges for their career development.

Keywords: **Teacher Competence, Professional Development, Teacher Learning, Technical and Vocational Education and Training (TVET)**

INTRODUCTION

Education is essential to the development of a sustainable nation. However, education is also vulnerable to the effects of economic, technological, social, cultural, and local and global changes (United Nations Educational Scientific and Cultural Organization [UNESCO], 2017). These changes have impacted the education system around the world and caused the education system to face a huge and challenging wave of reforms (UNESCO, 2017). As a result, education today, especially in the field of Technical and Vocational Education and Training (TVET) emphasizes issues related to the quality of education (European Centre for the Development of Vocational Training [CEDEFOP], 2019; UNESCO, 2015; UNESCO-UNEVOC International Centre for Technical and Vocational Education and Training, 2020).

In Malaysia, various strategies continue to be formulated and implemented by the Ministry of Education (MOE) to balance current changes and demands. In 2011, the Vocational Education Transformation Plan was initiated and empowerment measures continued to be implemented from 2017 until now (MOE, 2018). As a result, there are now 85 vocational colleges throughout Malaysia that share one goal which is to produce a skilled workforce to meet the needs of the industry. For the successful implementation of curriculum reform in vocational colleges, the competence of vocational teachers must be given serious attention to ensure that they can implement quality teaching. Vocational teachers are among the key individuals and agents of change in TVET (Chinedu, Wan Mohamed, & Ajah, 2018; Bakar, 2018). Teachers and the quality of their teaching are central to the development of vocational college students (Sulaiman & Wan Ahmad, 2018). Typically, the implementation of change is influenced by the ability of teachers and the quality of their work. It is implied in many studies that the success of the implementation of change depends on how teachers successfully improve the quality of their work. To ensure that vocational teachers can implement a quality teaching and learning process, teacher competence is one of the important factors that need to be considered (Bakar, 2018; Mohd Salleh & Lisa Sulaiman, 2015). They need to be given the opportunity to develop themselves in terms of knowledge, skills and attitude to be in line with current needs.

Past studies have found that there are several factors that influence teacher competence such as leadership (Bada, Tengku-Ariffin, & Nordin, 2020; Mei Wei, Yan Piaw, & Kannan, 2017; Shafee, Ghavifekr, & Abdullah, 2019), school climate (Zorkic & Jovanovic, 2020; Yusoff & Tengku-Ariffin, 2020), professional development (Abubakar, Tengku-Ariffin, & Md Jaafar, 2020; Andersson & Kopsen, 2019; Rauf, Ali, & Noor, 2017), motivation and teacher efficacy (Mat Zaini Abdullah, Rafisah Osman, & Fauziah Md Jaafar, 2016; Runhaar, Bednall, Sanders, & Yang, 2016; Stanton, Cawthon, & Dawson, 2017). Other than above factors, it was found that professional development factor is also important factor that needs to be considered as to improve teacher competence and effectiveness (Desimone & Pak, 2016; Kennedy, 2016; Kyriakides, Christoforidou, Panayiotou, & Creemers, 2017). Thus, it could be said that many factor contributes to teacher competence.

Professional development is said to be effective when it involves teachers actively and constructively in every teacher development program (Bautista, Yau, & Wong, 2017). They have the opportunity to be involved in activities such as observation, curriculum planning, evaluating student work, receiving and giving feedback and discussions (Desimone, 2009). There is evidence showing a positive effect of active learning on teacher teaching (Goos et al., 2020; Wilson, Sztajn, Edgington, Webb, & Meyers, 2017). The content of the professional development program should also be based on the subject content knowledge and the skills required by the teacher to implement the teaching in the classroom (Desimone & Garet, 2015; Kalinowski, Gronostaj, & Vock, 2019; Tran & Pasura, 2020). According to Desimone (2009), effective professional development should take into account the content of the lesson, teaching practices as well as the thinking and learning of students. However, the content of lessons among vocational teachers is different from academic teachers who can be learned by reading books and journals, as well as attending courses, instead the content of vocational teaching is more industry-based to prepare students to enter the working world (Kopsen, 2014). A study by Kopsen and Andersson (2018) found

that the professional development of vocational teachers is more valuable when the content leads to the realities of employment that students will face later in the industry world.

In addition, most researchers in the field of teacher development agree that effective professional development programs must involve teacher interaction through collective participation in each learning activity. This collective participation is believed to be an effective method to create a productive learning (Darling Hammond & Richardson, 2009; Hauge, 2019; Ronfeldt, Farmer, McQueen, & Grissom, 2015). This feature refers to the level of allocation for teachers to share teaching practices, cooperation, and collaboration among teachers from the school level, committee and grade of the same or different positions (Desimone & Pak, 2016). However, the study found that there are still vocational teachers who are not involved in the community (Fejes & Kopsen, 2012). This matter needs to be given serious attention because continuous interaction can develop a shared professional culture and produce mutual understanding among teachers, thereby potentially leading to improved education (Zuliana Mohd Zabidi, Zuraidah Abdullah & Bambang Sumintono, 2020). The collective participation of teachers in the Professional Learning Community (PLC), for example, proved to be very beneficial, not only to help teachers improve their knowledge and skills but also to help them flourish better attitudes and feelings towards their colleagues (Koellner, Jacobs, & Borko, 2011; Tengku-Ariffin, Awang-Hashim, & Yusof, 2014).

Professional development programs should also be implemented in line with knowledge, beliefs and educational policies such as content standards, curriculum and daily teaching (Desimone, 2009, Desimone & Pak, 2016). The alignment of these elements in a teacher professional development program can provide clear guidance, rather than entrusting it fully to the teachers to integrate new ideas and strategies in their teaching. However, there are some studies showing that professional development is less relevant to the curriculum used by teachers (Hiew & Murray, 2018) and does not meet the standards and content of teacher teaching (Lindvalla & Ryve, 2019; Sokel, 2019). Thus, the level of implementation of professional development is still in question and needs further study.

Teachers who are given the opportunity to follow professional development in an effective learning environment can improve the competence and effectiveness of their work (Hoekstra, Kuntz, & Newton, 2018). However, various issues related to the ineffective professional development can affect efforts to increase the capacity of teachers and eventually they feel uninterested in self-improvement. This is very worrying because the weakness of the implementation of professional development is feared to be the main reason for teachers lacking motivation and the declining of teacher work performance. A recent study proves that competent workers are productive workers (Khan & Abdullah, 2019). Mohd Hashim and Abubakar (2017) also found that competent vocational teachers can affect student achievement. Therefore, the question of how to improve the competence of vocational teachers must be given serious consideration.

This study was conducted to identify the relationship between professional development and vocational teacher competence in Kedah State Vocational College. The objectives of this study are as follows:

i. To identify the level of professional development and the competence of vocational teachers.
ii. To analyze differences in vocational teacher competence based on gender and working experience.
iii. To identify the relationship between professional development and vocational teacher competence.
iv. To identify the influence of professional development and the contribution of professional development elements towards the vocational teacher competence.

LITERATURE REVIEW

Teacher Professional Development

Professional development gives a wide and varied meaning based on the scope, focus and goals of a program (Bautista & Ortego-Ruiz, 2015). According to Borko (2004) and Desimone, Porter, Garet, Yoon, & Birman (2002),

the concept of teacher professional development is to enhance teachers' teaching knowledge and practice. Meanwhile, Guskey (2002) argues that the concept of teacher professional development is to change teachers' attitudes and beliefs. Opinions by Kazemi and Hubbard (2008) and Opfer and Pedder (2011) state that the development and professional learning of teachers is related to the development and enhancement of teacher expertise leading to changes in their practice to improve student learning outcomes. In the Malaysian context, the definition of professional development from the Ministry of Education Malaysia (MOE) in the Master Plan for Teacher Professionalism Development (2016) is the learning experience of teachers through formal and informal involvement in various career development activities to enhance knowledge, skills, expertise and value practices as well relevant professional characteristics to improve the quality of education to meet the educational needs of the 21st century. Overall, the definitions presented make it clear that the professional development of teachers is to enhance the professional competence of teachers throughout the service to ensure the quality of teaching is guaranteed.

Due to the differences and breadth of definitions put forward by previous researchers, the elements of professional development that can enhance teachers' teaching are gaining attention. According to Desimone (2009), effective professional development consists of characteristics such as active learning, focus in teaching content, time period, collective participation and coherent. There are also studies that found the quality of facilitators as an element of effective professional development (Bayar, 2014; Borko, 2004; Cheng & So, 2012). Meanwhile Ronfeldt et al. (2015) concludes that collaborative professional development in teams, specific and relevant to the curriculum can influence teachers' knowledge and practice as well as affect the implementation of curriculum changes. More research is needed to study the extent to which effective professional development can improve teacher practice and student learning in educational curriculum change situations (Bautista, Wong, & Gopinathan, 2015). Therefore, this study set out five elements of effective professional development namely active learning of teachers in the classroom, active learning of teachers outside the classroom, focus on teaching content, collective participation and coherence as suggested by Soine and Lumpe (2014).

Teacher Competencies

Teachers are the key pillar in the implementation of the mandate of each educational institution. Competent teachers are the backbone to effective teaching and learning. The scholars (Kleickmann et al. 2012; Yang, Kaiser, Konig, & Blomeke, 2018) agree that knowledgeable and skilled teachers are important in the teaching and learning process. In other words, teacher competence is one of the main constructs assessed to measure the level of quality of teacher work (Boahin & Hofman, 2014). Ismail, Hassan, & Rosli (2018) defines the competencies of TVET teachers as a combination of knowledge, skills and attitudes that can produce students who are skilled and meet the needs of the industry. Teacher competencies are acquired and can be enhanced through professional learning and development in the workplace (Ismail, Nopiah, Rasul, & Leong, 2017). In addition, teacher competence is the practice of knowledge and skills in certain activities or tasks to successfully meet the set performance (Ismail et al., 2017). Diep and Hartmann (2016) presented six types of vocational teacher competencies that include teaching ability, educating, professional competence, skills to relate learning to real work situations, language and communication skills, and self-assessment skills.

In short, competencies are a combination of knowledge, skills and attitudes acquired as a result of professional development such as actively and collectively engaging teachers, teacher learning focused on teaching content and in line with education policy. In this study, teacher competence was defined based on the definition of MOE (2016) in the Performance Standard of Education Service Officers, namely knowledge, skills and personal characteristics required to perform a task and responsibility in the job description.

Teacher competence has a relationship with various factors such as leadership, environment, teacher learning, self-efficacy, demographics and motivation. Most researchers agree that teacher learning through professional development programs has a positive and significant relationship with teacher competence (Abubakar et al., 2020;

Hoekstra et al., 2018; Gore et al., 2017;). Several other studies found that teacher competence also has a relationship with demographic factors such as gender, age and work experience (Abd Hamid, Syed Hassan, & Ismail, 2012; Wan Nazrul Azwana Wan Jalal, Wan Nasarudin Wan Jalal, Ahmad M Sharif, & Noraida Abdul Rahman, 2017). Findings of the study of Abd Hamid et al. (2012) found that the knowledge and skills of teachers with teaching experience of more than five years are increasing throughout the service. These findings indicate that teachers' work experience factors influence their level of competence where the longer a teacher serves, the higher their level of competence. However, there is a weak and insignificant relationship between teacher competence and teacher gender factors (Wan Nazrul Azwana Wan Jalal et al., 2017). Female teachers have the same level of work competence as male teachers because the workload and self-improvement opportunities provided between male and female teachers are the same in Malaysia.

Teacher Professional Development and Teacher Competencies

Past studies have shown that professional development has a positive effect on teacher competence and in turn has an impact on student achievement (Mohd Hashim & Abubakar, 2017). Teacher development that supports teacher learning positively and focuses specifically on teaching can have an impact on the quality of teacher teaching consistently (Gore et al., 2017; Hoekstra et al., 2018; Saroyan & Trigwell, 2015). The active learning of teachers in professional development can also affect teachers' teaching, but teachers think that active learning outside the classroom is challenging and difficult to implement (Hauge, 2019; Visnovska & Cobb, 2015). In addition, professional development tailored to the curriculum can renew and add to the existing knowledge and skills of vocational teachers to be in line with the needs of the industry (Andersson, Hellgren, & Kopsen, 2018; Andersson & Kopsen, 2019).

Kopsen and Andersson (2018) opined that the competence of vocational teachers needs to be improved from time to time through professional development activities so that their knowledge and skills constantly updated. This is because Huberman (1989) asserts that teacher competence decreases when entering the middle phase that is in the 19th year and above in the teaching service. Findings by Phin (2014) on 173 teachers in Cambodia showed that more than 90% of teachers think that teacher training can improve knowledge, skills and atitude. Teachers who have served for more than 15 years think that through in-service training they are more confident in imparting knowledge, skills and can form social relationships with students in the classroom (Andersson, Kopsen, Larson, & Milana, 2013; Mat Zaini Abdullah et al., 2016; Phin, 2014; Abd Hamid et al., 2012). Thus, the continuous involvement of teachers in professional development can provide new knowledge, skills and fresh ideas to produce effective teaching strategies.

Several other studies (King, 2016; Soine & Lumpe, 2014; Visnovska & Cobb, 2015) found that not all elements of professional development have a positive and significant relationship with teacher competence. However most studies measure professional development in uni-dimensional, rather than in multidimensional, so there is a need to conduct further studies to predict the influence of each element of professional development on teacher competence. The conceptual framework of the study linking to the study variables is shown in Figure 1.

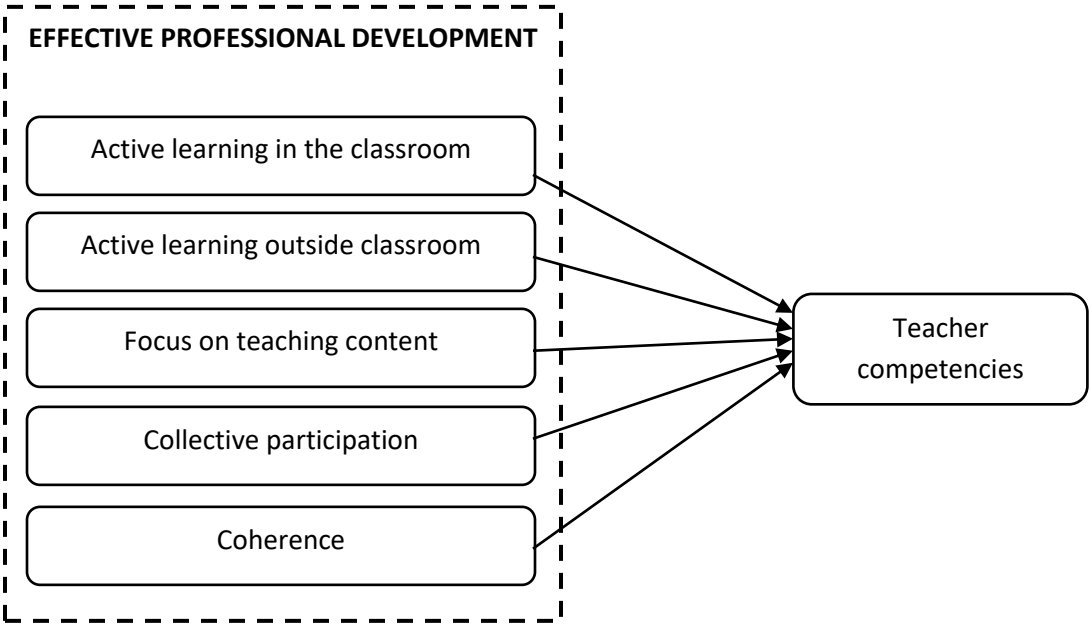

Figure 1. Conceptual framework that connects the elements of effective professional development with teacher competence.

METHODS

Research Design

A quantitative design and survey strategy were used to meet the research objectives. According to Johnson and Christensen (2014) the research objective in conducted quantitative study can be classified as descriptive, predictive or explanatory. Since this study attempts to identify of the relationship and influence of effective professional development on teacher competence, the objective of this study classified to descriptive and predictive. In order to achieve this objectives, this study employed descriptive survey and correlation research design.These designs had provided the opportunity to identify the direction and strength of the relation between the variables.

Population and Sampling

The selection of respondents used multi-level sampling method as suggested by Sekaran and Bougie (2016). In the first stage, researchers used cluster sampling based on vocational college clusters. Cluster sampling is usually readily available, and the cost of sampling from the entire population is more economical because the scope of the study has been reduced to clusters. The time and cost of contacting population elements are also reduced, especially if it involves travel because cluster sampling reduces the distance between sample elements.

Then to obtain a sample representative of the population of vocational teachers in Kedah state vocational colleges, stratified random sampling technique was used to identify vocational teachers from five vocational colleges as respondents (Sekaran & Bougie, 2016). For a population of 198, Krejcie and Morgan (1970) proposed a sample of 132, then the researcher used a sample of 137. This part of sampling process involves the stratification of teachers by name of vocational college and identification of the number of sample from each college based on a total of 137. This step ensures that the number of teachers involved was proportionate to the total number of teachers in

each vocational college. From there, the number of vocational teachers from each college to be involved were determined. In relation to this, the vocational teachers involved were simple randomly selected based on teachers' list from every vocational college. Demographic information of respondents is as shown in Table 1.

Table 1
Demographic Information of Respondents

Demographic information	Frequency	Percentage
Gender		
Male	66	48.2
Female	71	51.8
Age		
< 26	4	2.9
26-30	21	15.3
31-35	38	27.7
36-40	21	15.3
41-45	14	10.2
46-50	17	12.4
> 50	22	16.1
Level of Education		
Diploma	10	7.3
Bachelor degree	120	87.6
Master degree	7	5.1
Working Experience		
1-5	41	29.9%
6-10	25	18.2
11-15	19	13.9
16-20	11	8.0
>20	41	29.9

Instruments

The instruments selected in this study were those that have validity and reliability as described in the description below. A five-point scale (1-'strongly disagree', 5-'strongly agree') was used in the instrument as suggested by Sekaran and Bougie (2016) to measure the level of agreement of the respondents.

Validity and Reliability of the Instruments

The validity and reliability process of this study questionnaire used SmartPLS-SEM software. Assessment measurements were performed to obtain internal consistency, convergent validity and discriminant validity. Internal consistency measures the internal consistency between the items that make up the construct, convergent validity is to assess each item in each construct can reflect the construct. Loading indicator and Average Variance Extracted (AVE) value are used to obtain convergent validity. Meanwhile, discriminant validity refers to the extent the constructs under investigation are truly distinct from one another. In this study, Heterotrait-Monotrait ratio of correlations (HTMT) criteria were used to assess discriminant validity. HTMT refer to the ratio of correlations within the constructs to correlations between the construct. Validity and reliability of the instruments is as shown in Table 2 dan Table 3.

Table 2
Validity and Reliability Statistics

Construct	Items	Loadings	AVE	Composite Reliability
Active learning in the classroom	AD2	0.748	0.533	0.85
	AD3	0.764		
	AD4	0.704		
	AD5	0.692		
	AD6	0.738		
Active learning outside classroom	AL8	0.734	0.510	0.836
	AL9	0.723		
	AL10	0.728		
	AL12	0.656		
	AL13	0.711		
Focus on teaching content	FK14	0.717	0.510	0.918
	FK15	0.653		
	FK16	0.731		
	FK17	0.654		
	FK21	0.663		
	FK22	0.713		
	FK23	0.783		
	FK25	0.733		
	FK26	0.666		
	FK27	0.752		
	FK28	0.738		
Collective participation	CO32	0.664	0.512	0.88
	CO33	0.720		
	CO34	0.731		
	CO37	0.694		
	CO40	0.705		
	CO42	0.725		
	CO43	0.764		
Coherence	KO44	0.765	0.60	0.917
	KO45	0.778		
	KO46	0.791		
	KO47	0.833		
	KO48	0.828		
	KO49	0.651		
	KO50	0.650		
	KO51	0.740		
	KO52	0.684		
Teacher competence	KPN1	0.687	0.74	0.919
	KPN2	0.704		
	KPN3	0.677		
	KPN4	0.764		
	KPN5	0.710		
	KPN6	0.661		
	KPN7	0.722		
	KPN8	0.719		
	KPN9	0.694		

Construct	Items	Loadings	AVE	Composite Reliability
	KPN10	0.726		
	KPN11	0.726		
	KPN12	0.683		
	KPS13	0.788		
	KPS14	0.823		
	KPS15	0.860		
	KPS16	0.737		
	KPS17	0.804		
	KK18	0.711		
	KK19	0.818		
	KK20	0.803		
	KK21	0.771		
	KK22	0.871		
	KD23	0.888		
	KD24	0.914		
	KD25	0.899		

Table 3

Discriminant Validity Assessment Using the HTMT Criterion

	Active learning in the classroom	Active learning outside the classroom	Focus on teaching content	Collective participation	Coherence	Teacher competence
Active learning in the classroom						
Active learning outside the classroom	0.335 CI.90 (0.213, 0.438)					
Focus on teaching content	0.704 CI.90 (0.530, 0.846)	0.476 CI.90 (0.298, 0.640)				
Collective participation	0.724 CI.90 (0.591, 0.829)	0.464 CI.90 (0.298, 0.613)	0.75 CI.90 (0.588, 0.874)			
Coherence	0.559 CI.90 (0.391, 0.702)	0.301 CI.90 (0.170, 0.443)	0.69 CI.90 (0.561, 0.791)	0.624 CI.90 (0.490, 0.734)		
Teacher competence	0.818 CI.90 (0.711, 0.909)	0.431 CI.90 (0.245, 0.617)	0.81 CI.90 (0.714, 0.88)	0.829 CI.90 (0.740, 0.907)	0.688 CI.90 (0.572, 0.783)	

Effective Professional Development

The questionnaire Characteristics of Effective Professional Development which was adapted and modified from Soine and Lumpe (2014) contained 52 items and were broken down into five elements namely: a) active learning in the classroom, b) active learning outside the classroom, c) focus on teaching content, d) collective participation, and e) coherence. This instrument was modified in terms of sentence structure and the addition of the term "vocational college" to suit the situation of the respondents of this study. After the construct reliability and validity process was carried out, five elements were retained, yet only 37 items met the set criteria. Reliabilities of the five elements are .850 (active learning in the classroom, n=5 item), .836 (active learning outside classroom, n=5 item), .918 (focus on teaching content, n=11 item), .880 (collective participation, n=7 item), and .917 (coherence, n=9 item). The results of confirmative factor analysis reveal that the indicator loading of each item is higher than .65, and AVE value of each dimension is in the range of .51 - .60. In addition, the HTMT value of each elements is smaller than .85.

Teacher Competency

Measurement of teacher competency was adapted from the Performance Standards of Education Officers issued by the MOE in 2016 and Malaysia Teacher Standard (2009). This questionnaire contained 25 items and was minor modified in terms of addition of the term "vocational college" to suit the situation of the respondents of this study. The reliability test indicates a high reliability of this scale. The reliability of the teacher competency is .919 (n=25 item). The result of confirmative factor analysis reveals that the indicator loading of each item is higher than .65, AVE value is .74, HTMT value is smaller than .85.

Data Collection

The data collection process is executed after obtaining approval from the Education Policy Planning and Research Division, Ministry of Education Malaysia (MOE), Director of Kedah State Department and directors of vocational colleges in Kedah. The researcher contacted the administrators of the vocational colleges involved in the study to provide initial information about the study conducted. Then followed by a formal application by letter to the director of the vocational college in Kedah. After permission was obtained, the researcher distributed the questionnaire to the selected randomly respondents with the help of the head of the program in each vocational college.

The method of managing the questionnaire was done manually (self-administered) enabling the questionnaire to be well managed and retrieved more quickly, more feedback and any doubts by the respondents during the process of answering the questionnaire can be explained immediately. Vocational teachers were selected based on simple random sampling method. The time period given to answer the questionnaire was one week as suggested by Creswell (2014) and Sekaran and Bougie (2016) and answered questionnaire were collected immediately. A reminder on the deadline for the return of the questionnaire is attached along with the questionnaire form that has been distributed, to remind the respondents to answer the questionnaire before the date of collection.

RESULTS

Level of Professional Development and Vocational Teacher Competence

The mean values for each element were categorized into five categories namely high (> 4.00), medium high (3.01-4.00), medium (2.01-3.00), low (1.01-2.00) and very low (0.00-1.00) as suggested by Allen and Seaman (2007). This category was selected based on the five-point likert scale used in the study instrument. The mean values and interpretations for each element are shown in Table 4. Based on the findings of the study, four elements of

professional development were at a high level while one element was at a moderately high level. Active learning elements in the classroom (M = 4.38, SD = 0.47) showed the highest mean value compared to the other four elements. This showed that vocational teachers think they are actively involved in professional development activities to improve the quality of teaching and learning in the classroom. The element of collective participation was the second highest element (M = 4.24, SD = 0.48), in line with the desire of the Ministry of Education Malaysia (MOE) for teachers to improve the quality of knowledge delivery through the practice of collaboration with fellow teachers at various levels. The element of focus on teaching content and coherence also showed a relatively high mean value of (M = 4.22, SD = 0.39) and (M = 4.17, SD = 0.39), while the element of active learning outside the classroom showed the lowest mean value of (M = 3.59, SD = 0.65). Overall, vocational teachers showed a high level of professional development (M = 4.14, SD = 0.35) and a high level of competence (M = 4.22, SD = 0.41).

Table 4
Mean Values and Descriptive Interpretation of Professional Development and Vocational Teacher Competence Levels

Variables and Elements	Mean (M)	Standard Deviation (SD)	Level
Professional Development	4.14	0.35	High
Active learning in the classroom	4.38	0.47	High
Active learning outside the classroom	3.59	0.65	Moderately High
Focus on teaching content	4.22	0.39	High
Collective participation	4.24	0.48	High
Coherence	4.17	0.39	High
Teacher Competence	4.22	0.41	High

The Differences in Vocational Teacher Competence based on Demographic Factors (Gender and Work Experience)

Referring to the findings of the t-test, it was found that the mean for male teacher competence (M = 4.23, SD = 0.38) was almost the same as the female teacher competence (M = 4.22, SD = 0.43). The findings showed that there was no difference in the competence of vocational teachers based on gender (t (2) = 0.13, p = 0.90). Thus the first hypothesis of this study, H01 was accepted.

Table 5
T-Test Analysis of Vocational Teacher Competency Based on Gender

Gender	N	Mean(M)	Sandard Deviation(SD)	t-value	df
Male	66	4.23	0.38	0.13	135
Female	71	4.22	0.43		

To test the differences in teacher competency based on working experience, one-way ANOVA test was used. One of the assumptions of one-way ANOVA is that the variance of each group compared must be the same. The test for the homogeneity of variance obtained as a result of the Levene Test showed that the significant value (p = 0.527) was insignificant where p> 0.05, thus fulfilling the assumption that the variance population was homogeneous.

Findings in the ANOVA table showed that the significant value (p = 0.012) was smaller than p = 0.05. These results indicated that the null hypothesis (there is no difference in teacher competence based on working experience) should be rejected. Thus, the findings showed that there was a significant difference in teacher competence based on working experience, F(4,132) = 3.37, p = 0.012, p<0.05. To see which groups have different competencies, the

Post Hoc Test table was used. The findings showed that the 6-10 year experienced teachers has competency differences with the 11-15 year experienced teachers, while the competency of the 11-15 year experienced teachers was higher than the 6-10 year and 16-20 year experience groups. Based on Table 6, teachers with working experience of 11-15 years showed the highest mean level of competence (M = 4.45, SD = 0.37) while teachers in the category of 16-20 of working experience have the lowest mean level of competency that was (M = 3.99, SD = 0.40). This finding is in line with Huberman's (1989) view that teacher competence decreases when entering the middle period of the 19th year and above in teaching services.

Table 6
ANOVA Analysis of Vocational Teacher Competence based on Working Experience

Experience (Years)	N	Mean	Standard Deviation	F	df
1-5 years	41	4.20	0.33	3.37	4, 132
6-10 years	25	4.10	0.37		
11-15 years	19	4.45	0.37		
16-20 years	11	3.99	0.40		
> 20 years	41	4.28	0.46		

The Relationship between Professional Development and Vocational Teacher Competence

Table 7 shows the relationship between professional development and vocational teacher competence. Pearson's correlation coefficient (r) showed that professional development had a significant positive relationship with teacher competence ($r = 0.79$, $p < 0.01$). Thus, HA3 was accepted. Findings showed that professional development has a strong relationship with teacher competence (Cohen, 1988; Dancey & Reidy, 2011). These findings explained that the more effective the professional development received by teachers, the higher the knowledge, skills and attitudes of teachers.

Table 7
The Relationship between Professional Development and Vocational Teacher Competence

Construct	N	Mean	Standard Deviation	1	2
1. Professional Development	137	4.14	0.35	1.00	
2. Teacher Competence	137	4.22	0.41	0.79**	1.00

** significant at level 0.01(2-tailed)

The Influence of Professional Development on Vocational Teacher Competence

Tables 8 and 9 below report the results of multiple linear regression analysis. The findings showed that only four elements of professional development were significant contributors of 64% variance ($R2 = 0.64$, $F(5,131) = 46.17$, $p < 0.01$) to teacher competence namely, active in the classroom, focus on teaching content, collective participation and coherence. Therefore, these four elements were predictors for vocational teacher competence in the state of Kedah.

The professional development element that is, focus on teaching content was the main predictor of teacher competence in this analysis ($\beta = 0.38$, $t = 4.76$ and $p<0.05$) and contributed 53.1% to teacher competence. Therefore, when focus on teaching content increased by one unit, teacher competence would increase by 0.38. The second predictor was the coherence element ($\beta = 0.23$, $t = 2.99$ and $p < 0.05$) and has contributed 6.7% to

teacher competence. Therefore, teacher competence would increase by 0.23 units when coherence increased by one unit.

In addition, the third predictor was collective participation (β = 0.17, t = 2.45 and p <0.05) and has contributed 2.2% to teacher competence. Therefore, for every increase by one unit of collective participation, there would be 0.17 unit increase in teacher competence. The fourth predictor was active earning in the classroom (β = 0.15, t = 2.38 and p<0.05) has contributed 1.5% to teacher competence whereby for every one unit increase in active learning in the classroom element, there would be an increase of 0.15 unit in teacher competence.

Table 8
Multiple Liner Regression Analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.80[a]	0.64	0.62	0.25

a. Predictors: (Constant), Active learning in the classroom, Active learning outside the classroom, Focus on teaching content, Collective participation, , Coherence
b. Dependent Variable: Teacher Competence

Table 9
The Influence of Elements in Professional Development on Vocational Teacher Competence

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	0.27	0.27		1.00	0.32
Active learning in the classroom	0.13	0.06	0.15	2.38	0.02
Active learning outside the classroom	0.04	0.04	0.07	1.11	0.27
Focus on teaching content	0.39	0.08	0.38	4.76	0.00
Collective participation	0.15	0.06	0.17	2.45	0.02
Coherence	0.24	0.08	0.23	2.99	0.00

Dependent Variable: Teacher Competence

DISCUSSION

The discussion related to the learning and competence of vocational teachers in this study is based on Vygotsky's Theory of Development (1978, 1987). This theory was chosen because it meets the two criteria that have been set, namely to be able to provide explanations and make predictions. Thus, researchers formed the hypothesis that there is a significant relationship between professional development and vocational teacher competence. Specifically, the researcher analyzed five elements of professional development to identify predictive elements to the competence of vocational teachers. Vygotsky's Theory of Development (1978, 1987) is a theory derived from the principle that the relationship between the individual and his environment is interrelated in human development. This theory assumes that the mental function of the individual is formed through social interaction. This theory explains that knowledge and skills are acquired through a process of interplay between previous experiences and new learning. The findings of this study have supported the arguments in these theories and explained in detail each element of professional development that influences the competence of vocational teachers.

Level of Professional Development and Vocational Teacher Competence

The level of professional development and competence of vocational teachers in this study was high. These findings showed that vocational teachers have gained positive professional development experience and have

good teaching professionalism. These findings are in line with previous studies such as the study by Zaini and Mansor (2019), Yaakob, Don, Sufi and Yusof (2020), Muhd Khaizer Omar, Farah Nadia Zahar and Abdullah Mat Rashid (2020), Wan Nazrul Azwana Wan Jalal et al. (2017) who found that the level of professional development and teacher competence to be high. These findings also gave the impression that vocational teachers were also given the opportunity to pursue quality professional development, which in turn has improved their teaching competence.

Differences in Vocational Teacher Competence based on Demographic Factors (Gender and Working Experience)

The findings of the study showed that there was no difference in the competence of vocational teachers based on gender, but there was a difference in teacher competence based on working experience. This result supports the findings of a previous study by Othman and Mat Nashir (2010) and Wan Nazrul Azwana Wan Jalal et al. (2017) that there is no difference in competence of female lecturers compared to men. A study by Abd Hamid et al. (2012) found that the cognitive quality of teachers with more than five years of teaching experience and skills acquired throughout the service can indirectly affect their work performance and classroom management. In line with that, a study by Nor Hayati Ramlan et al. (2017) found that the level of general and generic competence of Vocational College lecturers varies according to teaching experience. The findings of a qualitative study by Khaliza Saidin, Shaznoorazlina Shafii & Arsaythamby Veloo (2020) also suggested that novice teachers need to exchange ideas and discuss with more experienced fellow teachers as well as engage in professional development to improve their competence.

In addition, it can be concluded that the level of teacher competence is more influenced by work experience and work environment factors than gender. Furthermore, this can be understood more clearly based on the distribution of tasks given by school administrators regardless of gender differences. Therefore, school administrators should ensure that fair and equitable space and opportunities are given to all teachers to increase their potential regardless of whether they are male or female teachers.

The Relationship between Professional Development and Vocational Teacher Competence

This study also found that professional development has a strong relationship with the competence of vocational teachers. These findings are in line with several previous studies (Gore et al., 2017; Hoekstra, et al., 2018; Rauf et al., (2017). Specifically, it can be concluded that, the more effective professional development is received, the higher is the teacher competence. Therefore, school administrators should ensure that professional development received by teachers is effective to have a positive impact on their competence.

Past studies conducted by Bautista et al. (2017), Desimone and Pak (2016) and Tran and Pasura (2020) showed that effective professional development such as focusing on teacher teaching content, providing opportunities for teachers to collaborate, teacher learning actively and in parallel with education policy can improve teacher competence. In addition, there is evidence to support that professional development can have a positive impact on teachers, including improving professional knowledge, improving teaching capability and fostering teacher professionalism (Avalos, 2011). Other studies by Khan, Siddiqui and Abbasi (2020) and Yoo (2016) found that teaching capability is also influenced by professional development programs. In other words, the level of professional development and competence of vocational teachers can also show the capability of teachers in conducting teaching in the classroom.

The Influence of Professional Development on Vocational Teacher Competence

In line with previous studies by Desimone and Pak (2016), Goos et al. (2020), Hoekstra et al. (2018), Sokel (2019), the findings showed that elements of teacher active learning in the classroom, focus on teaching content, collective participation and coherence has an influence on teacher competence. The novelty of this study can be

demonstrated when the elements of professional development were analyzed separately to predict teacher competence. In addition, the active learning element is detailed to active learning in the classroom and active learning outside the classroom. As a result of the five elements of professional development analyzed, the findings showed that only four elements were significant predictors of vocational teacher competence. However, the element active learning outside the classroom did not have a significant influence on teacher competence even though the mean level was moderately high. This finding is in line with the findings by Visnovska and Cobb (2015) who found that teachers feel that active learning outside the classroom is challenging and difficult to implement. This is because, teachers need to learn to understand the learning needs of students indirectly outside the classroom without the presence of students, while the findings of the study showed that teaching that focuses on the needs of students can improve teacher development because teachers learn from their students (Wilson et al., 2017). Therefore, this study explained that professional development has an influence on the competence of vocational teachers, especially involving programs that are in line with the teaching content and needs of teachers (Hoekstra et al., 2018). Therefore, school administrators and those who provide training to vocational teachers should be responsible for providing high quality professional development and can meet the teaching needs of teachers. This is because, effective professional development can provide new knowledge and skills as well as new ideas to produce effective teaching strategies in line with industry needs as suggested by Kennedy (2016) and Kalinowski et al. (2019).

LIMITATION

This study has certain limitations that affect the findings and interpretation of the study. First, this study involved vocational college teachers who teach vocational subjects. Therefore, the information of the study results is limited in its use to the situation and type of background similar to this study only. The findings of this study also cannot represent all vocational college teachers throughout Malaysia because the sample size of the study is limited to vocational teachers from one of the states in Malaysia. The sample of the study can be extended by including vocational teachers from other states.

Besides, this study also only focuses on variables related to effective professional development and competence of vocational teachers only, based on theories, models and literature highlights for this study. Therefore, this study provides an in-depth explanation and understanding of the relationship between these variables, which is limited to the operational definition of the dimensions studied by the researcher only. Future study can examining the contribution of the psychological aspects that can be presented as mediating influence or moderating in relationship between effective professional development and vocational teacher competencies.

This study is a quantitative study using cross -sectional survey method. Questionnaires were used to obtain data for analysis. Analysis and discussion of the study findings based on the respondents' feedback obtained from the questionnaire. Therefore, the results of this study are limited to the willingness and honesty of respondents to provide feedback.

CONCLUSION AND IMPLEMENTATION

The positive effect of professional development on the competence of vocational teachers in this study can provide guidance to school administrators in an effort to improve the ability and potential of vocational teachers through continuous learning. This study has shown that the elements of professional development that can predict vocational teachers competence is the active learning of teachers in the classroom, focus on teaching content, collective participation and coherence. Teachers who receive learning experiences that can meet their needs will feel more confident in implementing educational change and in turn can continuously improve their competence. On the other hand, if the professional development received by teachers is generic and unsatisfactory, their work motivation and job performance will decline. As a result, they will not be interested and try to avoid following professional development activities.

The results of this study are important to identify the characteristics of effective professional development programs that can help shape and maintain teacher competencies at set standards. This is in line with government policy planning to make the Teacher Professional Development Plan as part of the method of improving the quality of teachers in terms of knowledge, skills and professionalism of teachers. Besides, the findings of this study can be used as a reference to relevant parties, including school administrators, vocational teacher training providers, Vocational Technical Education and Training Division (BPLTV) and vocational teachers in a joint effort to continuously improve teacher competencies, especially in facing TVET education reform. School administrators and BPLTV need to support vocational teachers to maintain and enhance their competencies by providing effective professional development. This support can be provided in various form such as sufficient time to build new learning, clear instruction and learning outcomes, feedback, opportunities to learn and practice new teaching as well as create a culture of collaboration. Teacher training providers should avoid the approach of one training for all, instead the differences in the needs of each teacher should be emphasized before any professional development activities are planned. In addition, they must be more sensitive to how teachers learn from their students so that the desire to make quality vocational teachers is achived. Future research can replicate the study by examining the contribution of the elements of professional development towards teacher competence through psychological aspects that can be presented as mediating influence or moderating.

ACKNOWLEDGEMENTS

This paper is part of the first author's doctoral study at Universiti Utara Malaysia. The study was supported by the scholarship Division, Ministry of Education, Malaysia, under the Federal Training Grant (HLP) (no: KPM. BT.700-30/17/34).

REFERENCES

Abd Hamid, S. R., Syed Hassan, S. S., & Ismail, N. H. (2012). Teaching quality and performance among experienced teachers in Malaysia. *Australian Journal of Teacher Education, 37*(11), 85-103.http://dx.doi.org/10.14221/ajte.2012v37n11.2

Abubakar, A., Tengku Ariffin, T.F., & Md Jaafar, F. (2020). Connecting teacher professional development, wellbeing and effectiveness. *European Academic Research, 7*(12), 6053-6063. Retrieved from http://www.euacademic.org/UploadArticle/4301.pdf

Allen, I.E., & Seaman, C.A. (2007). Likert scales and data analyses. *Quality Progress, 40*, 64-65.

Andersson, P., Hellgren, M., & Köpsén, S. (2018). Factors influencing the value of CPD activities among VET teachers. *International Journal for Research in Vocational Education and Training*, *5*(2), 140-164. https://doi.org/10.13152/IJRVET.5.2.4

Andersson, P., & Köpsén, S. (2015). Continuing professional development of vocational teachers: Participation in a Swedish national initiative. *Empirical Research in Vocational Education and Training, 7*(7), 1–20. doi:10.1186/s40461-015-0019-3

Andersson, P., & Köpsén, S. (2019). VET teachers between school and working life: Boundary processes enabling continuing professional development. *Journal of Education and Work,* 1–15. doi:10.1080/13639080.2019.1673888

Andersson, P., Köpsén, S., Larson, & Milana, M. (2013). Qualification paths of adult educators in Sweden and Denmark. *Studies in Continuing Education, 35*(1), 102-118. doi: 10.1080/0158037X.2012.712036

Avalos, B. (2011). Teacher professional development in Teaching and Teacher Education over ten years. *Teaching and Teacher Education*, *27*, 10-20. doi:10.1016/j.tate_2010.08.007

Bada, H. A., Tengku Ariffin, T.F., & Nordin, H. (2020). The effectiveness of teachers in Nigerian secondary schools: The role of instructional leadership of principals. *International Journal of Leadership in Education*, 1–28. doi:10.1080/13603124.2020.1811899

Bakar, R. (2018). The influence of professional teachers on Padang Vocational School students' achievement. *Kasetsart Journal of Social Sciences*, 39, 67-72. https://doi.org/10.1016/j.kjss.2017.12.017

Bautista, A., & Ortega-Ruíz, R. (2015). Teacher professional development: International perspectives and approaches. *Psychology, Society and Education, 7*(3), 240-251.

Bautista, A., Wong, J., & Gopinathan, S. (2015). Teacher professional development in Singapore: Depicting the landscape. *Psychology, Society, & Education, 7*(3), 311-326. Retrieved from https://repository.nie.edu.sg/bitstream/10497/18171/1/PSE-7-3-311.pdf

Bautista, A., Yau, X., & Wong, J. (2017). High-quality music teacher professional development: A review of the literature. *Music Education Research, 19*(4), 455-469. https://doi.org/10.1080/14613808.2016.1249357

Bayar, A. (2014). The components of effective professional development activities in terms of teachers' perspective'. *International Online Journal of Educational Sciences, 6/2*, 319–27.

Boahin, P., & Hofman, W. H. A. (2014). Perceived effects of competency-based training on the acquisition of professional skills. *International Journal of Educational Development, 36*, 81–89. doi.org/10.1016/j.ijedudev.2013.11.003

Borko, H. (2004). Professional development and teacher learning: Mapping the terrain. *Educational Researcher, 33*(8), 3-15.

Cheng, M. M. H., & So, W. W. M. (2012). Analysing teacher professional development through professional dialogue: An investigation into a university–school partnership project on enquiry learning. *Journal of Education for Teaching: International Research and Pedagogy, 38*(3), 323–341. doi:10.1080/02607476.2012.668331

Chinedu, C. C., Wan Mohamed, W. A., & Ajah, A. O. (2018). A systematic review on education for sustainable development: Enhancing TVE teacher training programme. *Journal of Technical Education and Training*, *10*(1). Retrieved from https://publisher.uthm.edu.my/ojs/index.php/ JTET/article/view/1678

Creswell, J. W. (2014). *Research design: Qualitative, quantitative and mixed method approaches* (4th ed.). California: SAGE Publications, Inc.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillsdale, NJ: Lawrence Earlbaum Associates.

Dancey, C. P., & Reidy, J. (2011). *Statistics without maths for psychology*. (5th ed.). Italy: Pearson Education Limited.

Darling-Hammond, L., & Richardson, N. (2009). Teacher learning: What matters? *Educational Leadership, 66*(5), 46–53.

Desimone, L. M. (2009). Improving impact studies of teachers' professional development: Toward better conceptualizations and measures. *Educational Researcher, 38*(3), 181–199. doi:10.3102/0013189x08331140

Desimone, L. M., & Garet, M. S. (2015). Best practices in teachers' professional development in the United States. *Psychology, Society and Education, 7*(3), 252-263.

Desimone, L. M., & Pak, K. (2016). Instructional coaching as high-quality professional development. *Theory into Practice, 56*(1), 3–12. doi:10.1080/00405841.2016.1241947

Desimone, L. M., Porter, A. C., Garet, M. S., Yoon, K. S., & Birman, B. F. (2002). Effects of professional development on teachers' instruction: Results from a three-year longitudinal study. *Educational Evaluation and Policy Analysis, 24*(2), 81-112.

Diep, P.C., & Hartmann, M. (2016). Green skills in vocational teacher education – A model of pedagogical competence for a world of sustainable development. *TVET@Asia, 6*, 1-19. Retrieved from http://tvet-online.asia/issue/6/diep-hartmann/

European Centre for the Development of Vocational Training. (2019). *Vocational education and training in Finland: short description*. Luxembourg: Publications Office. Retrieved from http://data.europa.eu/doi/10.2801/841614

Fejes, A., & Kopsen, S. (2012). Vocational teachers' identity formation through boundary crossing. *Journal of Education and Work, 27*(3), *265–283.* doi:10.1080/13639080.2012.742181

Garet, M. S., Porter, A. C., Desimone, L., Birman, P. F., & Yoon, K. S. (2001). What makes professional

development effective? Result from a national sample of teachers. *American Educational Research Journal, 38*(4), 915-945.

Goos, M., O'Donoghue, J., Ní Ríordáin, M., Faulkner, F., Hall, T., & O'Meara, N. (2020). Designing a national blended learning program for "out-of-field" mathematics teacher professional development. *ZDM.* doi:10.1007/s11858-020-01136-y

Gore, J., Lloyd, A., Smith, M., Bowe, J., Ellis, H., & Lubans, D. (2017). Effects of professional development on the quality of teaching: Results from a randomised controlled trial of Quality Teaching Rounds. *Teaching and Teacher Education, 68,* 99-113.

Guskey, T. R. (2002). Professional development and teacher change. *Teachers and Teaching: Theory and Practice, 8*(3). 381-391. doi: 10.1080/135406002100000512

Hair, J. J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2014). *Multivariate data analysis*. (7th ed.). Essex: Pearson Education Limited.

Hauge, K. (2019). Teachers' collective professional development in school: A review study. *Cogent Education, 6*: 1619223.doi:10.1080/2331186X.2019.1619223

Hiew, W., & Murray, J. (2018). Issues with effective design of an ESL teacher professional development programme in Sabah, Malaysia. *Manu: Jurnal Pusat Penataran Ilmu dan Bahasa (PPIB)*, 51 - 76. Retrieved from https://doi.org/10.51200/manu.v0i0.1582

Hoekstra, A., Kuntz, J., & Newton, P. (2018). Professional learning of instructors in vocational and professional education. *Professional Development in Education, 44*(2), 237-253. doi: 10.1080/19415257.2017.1280523

Huberman, M. (1989). The professional life cycle of teachers. *Teacher College Records, 91*, 31-57.

Ismail, A., Hassan, R., & Rosli, D. I. (2017). The skill and competency of Technical and Vocational Education and Training (TVET) personnel for the development and implementation of a National Teacher Standard in TVET in Malaysia. *Pertanika Journal of Social, Sciences. & Humanities, 25*, 109 – 120.

Ismail, K., Nopiah, Z. M., Rasul, M. S., & Leong, P. C. (2017). Malaysian teachers' competency in technical vocational education and training: A review. In Abdullah et al. (Eds.), *Regionalization and Harmonization in TVET.* London: Taylor & Francis Group

Johnson, R. B., & Christensen, L. (2014). *Educational research: Quantitative, qualitative and mixed approaches* (5th ed.). Thousand Oaks, CA: SAGE Publications, Inc.

Kalinowski, E., Gronostaj, A., & Vock, M. (2019). Effective professional development for teachers to foster students' academic language proficiency across the curriculum: A systematic review. *AERA Open, 5*(1), 1-23. doi:10.1177/2332858419828691

Kazemi, E., & Hubbard, A. (2008). New directions for the design and study of professional development: Attending to the coevolution of teachers' participation across contexts. *Journal of Teacher Education, 59*(5), 428-441. doi: 10.1177/0022487108324330

Kennedy, M. M. (2016). How does professional development improve teaching? *Review of Educational Research, 86(4), 945–980.* doi:10.3102/0034654315626800

Khaliza Saidin, Shaznoorazlina Shafii, & Arsaythamby Veloo. (2020). Novice teachers' strategies to overcome the challenges in teaching and learning. *Ilkogretim Online-Elementary Education Online, 19*(2), 69-78. doi:10.17051/ilkonline.2020.02.108

Khan, S., & Abdullah, N. (2019). The impact of staff training and development on teachers' productivity. *Economics, Management and Sustainability, 4*(1), 37-45. doi:10.14254/jems.2019.4-1.4

Khan, A., Siddiqui, SH., & Abbasi, MI. (2020). Professional development as a determinant of self-efficacy of TVET teachers, under the mediating & moderating effect of technology training and work culture. *Pakistan Journal of Social Sciences (PJSS), 40*(2), 745-757.

King, F. (2016). Teacher professional development to support teacher professional learning: Systemic Factors from Irish case studies. *Teacher Development*, 20(4), 574–594. doi:10.1080/13664530.2016.1161661

Kleickmann, T., Richter, D., Kunter, M., Elsner, J., Besser, M., Krauss, S., & Baumert, J. (2012). Teachers' content knowledge and pedagogical content knowledge. *Journal of Teacher Education, 64*(1), 90–106. doi:10.1177/0022487112460398

Koellner, K., Jacobs, J., & Borko, H. (2011). Mathematics professional development: Critical features for developing leadership skills and building teachers' capacity. *Mathematics Teacher Education and Development, 13*(1), 115–136.

Kopsen, S. (2014). How vocational teachers describe their vocational teacher identity. *Journal of Vocational Education & Training, 66*(2), 194-21. doi:10.1080/13636820.2014.894554

Kopsen, S. & Andersson, P. (2018). Boundary processes in connection with students' workplace learning: Potentials for VET teachers' continuing professional development. *Nordic Journal of Vocational Education and Training* (*NJVET), 8*(1), 58–75. Retrieved from https://njvet.ep.liu.se/article/view/276

Kyriakides, L., Christoforidou, M., Panayiotou, A., & Creemers, B.P.M. (2017). The impact of a three-year teacher professional development course on quality of teaching: Strengths and limitations of the dynamic approach. *European Journal of Teacher Education*, 1-22. doi: 10.1080/02619768.2017.1349093

Lindvall, J., & Ryve, A. (2019). Coherence and the positioning of teachers in professional development programs. A systematic review. *Educational Research Review, 27,* 140-154. doi:10.1016/ j.edurev.2019.03.005

Mat Zaini Abdullah, Rafisah Osman, & Fauziah Md. Jaafar. (2016). Model motivasi kerja guru berdasarkan signifikasi tugas dan pengalaman psikologi [A teacher work motivation model based on task significance and psychological experiences]. *Malaysian Journal of Learning and Instruction (MJLI)*, *13*(2). 253-286.

Mei Wei, L., Yan Piaw, C., & Kannan, S. (2017). Relationship between principal technology leadership practices and teacher ICT competency. *MOJEM: Malaysian Online Journal of Educational Management, 4*(3), 13-36. doi:10.22452/mojem.vol4no3.2

Ministry of Education. (2016). *Dokumen awal: Pelan Induk Pembangunan Profesionalisme Keguruan* [Initial document: Master Plan for Teacher Professionalism Development]. Putrajaya: Ministry of Education. Retrieved from https://www.moe.gov.my/menumedia/media-cetak/penerbitan/1249-dokumen-awal-pelan-induk-pembangunan-profesionalisme-keguruan/file

Ministry of Education. (2018). *Laporan Tahunan 2017: Pelan Pembangunan Pendidikan Malaysia 2013-2025* [Annual Report 2017: Malaysia Education Development Plan 2013-2025]. Putrajaya: Ministry of Education.

Ministry of Education. (2016). *Standard Prestasi Pegawai Perkhidmatan Pendidikan* [Performance Standards of Education Service Officer]. Putrajaya: Ministry of Education. Retrieved from https://www.moe.gov.my/en/dasar/1221-standard-prestasi-ppp-edisi-awal-2016/file

Mohd Hashim, M. H., & Abubakar, B. (2017). The availability of electronic courses using ICT infrastructure in teaching and learning among teachers in Nigeria's TVET institutions. *Pertanika Journal of Social Sciences & Humanities*, *25* (Special issue). 17 – 28.

Mohd Salleh, K., & Lisa Sulaiman, N. (2015). Technical skills evaluation based on competency model for human resources development in technical and vocational education. *Asian Social Science*, *11*(16), 74-79. doi:10.5539/ass.v11n16p74

Muhd Khaizer Omar, Farah Nadia Zahar, & Abdullah Mat Rashid. (2020). Knowledge, skills, and attitudes as predictors in determining teachers' competency in Malaysian TVET institutions. *Universal Journal of Educational Research, 8*(3C), 95-104. doi: 10.13189/ujer.2020.081612

Nor Hayati Ramlan, Zuraidah Abdullah, & Sufean Hussin. (2017). Tahap kompetensi umum pensyarah teknologi pembinaan, kejuruteraan awam kolej vokasional, Kementerian Pendidikan Malaysia berdasarkan gred jawatan dan tahun pengalaman mengajar [General competence level of construction technology lecturer, civil engineering vocational college, Ministry of Education Malaysia based on position grade and years of teaching experience]. *Jupidi: Jurnal Kepimpinan Pendidikan*, *4*(4), 39-55. Retrieved from http://ijie.um.edu.my/index.php/JUPIDI/article/view/8472

Opfer, V. D., & Pedder, D. (2011). Conceptualizing teacher professional learning. *Review of Educational Research, 81*(3), 376–407. doi:10.3102/0034654311413609

Othman, A., & Mat Nashir, I. (2010). Competencies of female lecturers in handling mechanical workshop in Malaysian polytechnics. *VOCTECH Journals, 10*(1).

Phin, C. (2014). Teacher competence and teacher quality in Cambodia's educational context linked to in-service teacher training. An examination based on a questionnaire survey. *International journal of educational administration and policy studies, 6*(4), 62-69. doi:10.5897/IJEAPS2013.0326.

Rauf, P. A., Ali, S. K. S., & Noor, N.A. M. (2017).The relationship between models of teachers professional development and teachers' instructional practices in the classrooms in the primary schools in the state of Selangor, Malaysia. *International Journal of Education, Psychology and Counseling, 2*(5), 120-132. Retrieved from http://www.ijepc.com/PDF/IJEPC-2017-05-09-09.pdf

Ronfeldt, M., Farmer, S. O., McQueen, K., & Grissom, J. A. (2015). Teacher collaboration in instructional teams and student achievement. *American Educational Research Journal, 52*(3), 475–514. doi:10.3102/0002831215585562

Runhaar, P., Bednall, T., Sanders, K., & Yang, H. (2016). Promoting VET teachers' innovative behaviour: Exploring the roles of task interdependence, learning goal orientation and occupational self-efficacy. *Journal of Vocational Education & Training, 68*(4), 436-452. doi.org/10.1080/13636820.2016.1231215

Saroyan, A., & Trigwell, K. (2015). Higher education teachers' professional learning: Process and outcome. *Studies in Educational Evaluation, 46*, 92–101. doi:org/10.1016/j.stueduc.2015.03.008

Sekaran, U., & Bougie, R. (2016). *Research methods for business: A skill building approach* (7th ed.). West Sussex, UK: John Wiley & Sons Ltd.

Shafee, S., Ghavifekr, S., & Abdullah, Z. (2019). Leadership role of coaches in improving teachers' instructional practices. *MOJEM: Malaysian Online Journal of Educational Management, 7*(1), 92-112. Retrieved from https://mojem.um.edu.my/article/view/15763

Soine, K. M., & Lumpe, A. (2014). Measuring characteristics of teacher professional development. *Teacher Development, 18*(3), 303–333. doi:10.1080/13664530.2014.911775

Sokel, F. (2019). The effectiveness of a professional development course: teachers' perceptions. *ELT Journal, 73*(4), 409-418. doi:10.1093/elt/ccz022

Stanton, K., Cawthon, S., & Dawson, K. (2017). Self-efficacy, teacher concerns, and levels of implementation among teachers participating in drama-based instruction professional development. *Teacher Development, 22(1), 51–77.* doi:10.1080/13664530.2017.1308430

Sulaiman, J., & Wan Ahmad, W. M. R. (2018). Kompetensi dalam menentukan profesionalisme guru vokasional di Malaysia: Cabaran ke arah pembangunan profesionalisme guru TVET [Competence in determining the professionalism of vocational teachers in Malaysia: Challenges towards the development of TVET teacher professionalism]. *Online Journal for TVET practitioners: Multidisciplinary Research in Education, 3*(special issue), 13-18. Retrieved from https://publisher.uthm.edu.my/ojs/index.php/oj-tp/article/view/4794

Tengku Ariffin, T. F., Awang Hashim, R., & Yusof, N. (2014). Proximal and distal outcomes of organizational socialization among new teachers: A mediation analysis. *Teacher Development*, *18*(2), 163-176. doi.org/10.1080/13664530.2014.891535

Tran, L. T., & Pasura, R. (2020). The nature of teacher professional development in Australian International Vocational Education. *Journal of Further and Higher Education,* 1–14. doi:10.1080/ 0309877x.2019.1702153

UNESCO-UNEVOC International Centre for Technical and Vocational Education and Training. (2020). *UNESCO-UNEVOC study on the trends shaping the future of TVET teaching*. Retrieved from https://unevoc.unesco.org/pub/trendsmapping_futureoftvetteaching.pdf

United Nations Educational Scientific and Cultural Organization. (2015). *Teachers and educational quality: Monitoring global needs for 2015*. Retrieved from https://unesdoc.unesco.org/ark:/48223/pf0000145754

United Nations Educational Scientific and Cultural Organization. (2017). *Education for sustainable development goals: Learning objectives*. Retrieved from https://unesdoc.unesco.org/ark:/48223/pf0000247444

Visnovska, J., & Cobb, P. (2015). Learning about whole-class scaffolding from a teacher professional development study. *ZDM Mathematics Education, 47*, 1133–1145. doi:10.1007/s11858-015-0739-7

Vygotsky, L. S. (1978). *Mind in society. The development of higher psychological processes.* Cambridge: Harvard University Press.

Vygotsky, L. S. (1987). Thinking and speech (N Minick, Trans.). In: Rieber RW and Carton AS (Eds.) *The collected works of L. S. Vygotsky. Vol. 1. Problems of general psychology*. New York: Plenum Press, pp. 39–285.

Wan Nazrul Azwana Wan Jalal, Wan Nasarudin Wan Jalal, Ahmad M. Sharif & Noraida Abdul Rahman. (2017). Penggredan semula sekolah menengah vokasional kepada kolej vokasional: Kajian tahap kompetensi kaedah pengajaran dan pembelajaran pengajar [Regrading of Vocational Secondary Schools to Colleges Vocational: A Study of Competency Levels of Teaching Methods and Instructor Learning]. *Skills Malaysia Journal, 3*(1), 9 – 16.

Wilson, P. H., Sztajn, P., Edington, C., Webb, J., & Myers, M. (2017). Change in teachers´ discourse about students in a professional development on learning trajectories. *American Educational Research Journal, 54*(3), 568–604. doi:10.3102/0002831217693801

Yaakob, M. F. M., Don, Y., Sufi, I., & Yusof, M. R. (2020). Teachers' professional development level across cohort of generations in Malaysia. *International Journal of Instruction, 13*(4), 443-456. doi:org/10.29333/iji.2020.13428a

Yang, X., Kaiser, G., König, J., & Blömeke, S. (2018). Measuring Chinese teacher professional competence: Adapting and validating a German framework in China. *Journal of Curriculum Studies, 50*(5), 638–653. doi:10.1080/00220272.2018.1502810

Yoo, J. H. (2016). The effect of professional development on teacher efficacy and teachersí self-analysis of their efficacy change. *Journal of Teacher Education for Sustainability, 18*(1), 84-94. doi:10.1515/jtes-2016-0007

Yusoff, S. M., & Tengku-Ariffin, T. F. (2020). Looking after teacher wellbeing: Does teacher empowerment matter? *Malaysian Online Journal of Educational Management*, *8*(4), 43-56. Retrieved from https://mojem.um.edu.my/article/view/26381

Zaini, Z. H., & Mansor, M. (2019). Persepsi guru prasekolah kebangsaan terhadap program pembangunan profesional guru [National preschool teacher's perception towards professional development program]. *Southeast Asia Early Childhood Journal*, *8*(1), 30-36. https://doi.org/10.37134/saecj.vol8.no1.4.2019

Zuliana Mohd Zabidi, Zuraidah Abdullah, & Bambang Sumintono. (2020). Professional Learning Communities (PLCs) across MARA learning institutions: Retrieving unpublished evidence. *Journal of Educational Research and Indigenous Studies, 2*(2). Retrieved from https://static.s123-cdn.com/uploads/1759562/normal_5f681927ce195.pdf

Zorkic, T.J., & Jovanovic, V. (2020). Constructivist beliefs and teaching practices in different school environments. *Malta Review of Educational Research, 14* (Supplement Issue), 13-26. Retrieved from http://www.mreronline.org/wp-content/uploads/2020/08/2Constructivist-Beliefs-Jokic%CC%81-Zorkic%C%81 -and-Jovanovic%CC%81.pdf