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Professional learning of vocational teachers in the context of work placement

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Chapter 6

Factors predicting vocational teachers' transfer of learning: A quantitative study in the context of work placement

This chapter is an adapted version of:

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Abstract

Work placement is an important way for vocational teachers to update their vocational knowledge and skills. Apart from professional learning during work placement, vocational teachers' application of learning from work placement in school afterwards is also crucial. In this study, we aimed to explore the factors predicting vocational teachers' transfer of learning from work placement to their school. Participants were 372 Chinese secondary vocational teachers from various subject areas. The measurement model showed a good fit. Path analysis results showed that occupational experience, work placement period, personal capacity, content relevance, peer support, and opportunity to use were positive predictors of the transfer of what they learned. Yet, teaching experience and supervisor support were not significant predictors of this transfer generalisation. Besides, transfer generalisation and perceived effects positively predicted vocational teachers' intentions to maintain what they transferred. No moderating effects of the transfer period and perceived effects were found. Theoretical and practical implications are discussed.

6.1 Introduction

In the past decades, vocational teachers' professional learning has obtained much attention from scholars, policymakers, and school leaders (Bound, 2011; Hoekstra et al., 2018; Oude Groote Beverborg et al., 2015; Zeggelaar et al., 2020). Apart from regular learning in school workplace, vocational teachers' learning in the industrial context was also considered an important source to develop themselves, in particular, to improve their occupational expertise. As Andersson and Köpsén (2018) stated, 'The conditions VET teachers face as they seek to develop industry currency are complex as current vocational knowledge is situated in specific work-life practices separated from the practice of school' (p.318). To promote vocational teachers' learning in the real world of work, work placement has been implemented in many countries, including Finland, Australia, China, and England, albeit with different labels, such as work placement periods, industry release, and hands-on programmes (Lloyd & Payne, 2012; Tyler & Dymock, 2019). It is defined as a continuing professional development programme in which vocational teachers acquire occupational knowledge and skills by participating in 'the vocational, work-life community of practice of their teaching subject' (Andersson & Köpsén, 2015, p.2). Through this programme, vocational teachers can break boundaries between school and working life (Andersson & Köpsén, 2015; Lloyd & Payne, 2012).

In China, work placement has been a compulsory programme for all in-service vocational teachers since 2016. The latest document published by the Chinese government states that all vocational teachers are required to undertake work placement for at least one month annually (Ministry of Education of the People's Republic of China & Ministry of Finance of the People's Republic of China, 2021). Most vocational teachers attend work placement during their summer or winter break due to the shortage of teachers to take over their work. During work placement, vocational teachers are encouraged to learn from a variety of formal and informal activities. Qualitative findings from a previous study (Zhou, Tigelaar, & Admiraal, 2021) revealed that vocational teachers learn through doing daily work as an employee, trying out new technologies or work methods, reflecting on these experiences, talking with colleagues, supervisors, or clients in work-life communities, and reading work manuals.

To ensure the efficiency of work placement, both the processes of vocational teachers' learning and transfer of learning are seen as important. The latter concerns

teachers' application of what they have learned in their school workplace, which is directly linked to their teaching performance in school. Previous studies have investigated factors influencing vocational teachers' participation or learning in work placement, such as financial problems, increasing workload, policy regulations, and motivational beliefs (Lloyd & Payne, 2012; Schmidt, 2019; Zhou, Tigelaar, & Admiraal, 2022a). However, a comprehensive overview of factors linked to both transfer of learning and the maintenance of that transfer is still missing. Therefore, the aim of this study is to gain insights into what factors facilitate or hinder vocational teachers' transfer of their learning from work placement to school. The results can enrich our understanding of the process of vocational teachers' learning transfer and support programme designers, policymakers, and school leaders to help vocational teachers to achieve better learning transfer results.

6.2 Literature review

6.2.1 Transfer of learning

Transfer of learning is defined as 'the application of learning acquired within a certain task, situation, or context to another, different task, situation, or context' (Murphy & Tyler, 2005, p.458). As many learning activities are organised as training for improving employees' work performance, the term 'transfer of training' is also frequently adopted (Blume et al., 2010; Gegenfurtner, Veermans, & Vauras, 2013; Suleiman, Dassanayake, & Abang Othman, 2018).

Two aspects of the transfer of learning have been distinguished in earlier work: transfer generalisation and transfer maintenance. These two aspects aim to answer two questions, respectively: 'To what extent individuals' application of learning to their work environment are generalised' and 'To what extent this application persists over time' (Baldwin & Ford, 1988; Blume et al., 2010). Although these two aspects were clarified, limited research applied both of them to measure individuals' transfer of learning, and in particular, transfer maintenance has often been ignored. This also means that if transfer maintenance follows transfer generalisation, the prediction of transfer maintenance by transfer generalisation has not been investigated yet.

Transfer of learning has been studied by many scholars. A few theoretical frameworks and models have been initialled to understand this concept (Blume et al., 2019; Holton, 2005; Vermeulen & Admiraal, 2009). However, most studies on the

transfer of learning are situated in the general field of human resource management, and much fewer studies focused on teachers' professional development and learning. In the field of teacher professional development, compared to the transfer on behaviour, an immediate gain in teachers' cognitions has been more frequently established (Fisher et al., 2010; Hoekstra et al., 2009). Besides, many studies on teachers' transfer of learning merely considered transfer results (changes) in practice instead of the transfer process (Bishop et al., 2012; Hoekstra et al., 2009; Tam, 2014). This leads to our first hypothesis:

H1: Vocational teachers' transfer generalisation will positively predict their transfer maintenance intention.

6.2.2 Factors influencing the transfer of learning

To get a comprehensive understanding of the transfer of learning, previous research strived to explore what factors influence individuals' transfer of learning. In 1988, Baldwin and Ford (1988) proposed a theoretical model of the transfer process. In general, there were three domains of input factors in this model, i.e., trainee characteristics, work environment, and training interventions. Based on this classification, Blume et al. (2010) conducted a meta-analysis of 89 empirical studies and summarised all influencing factors for the transfer of learning and training. This model of factors was then developed further in another review study by De Rijdt et al. (2013), which focused on staff development in higher education. Moreover, Zhou, Tigelaar, and Admiraal (2022b) also explored factors influencing vocational teachers' transfer of learning based on a qualitative method and several factors within the above-mentioned three domains were generated.

6.2.2.1 Teacher characteristics

Teacher characteristics include teachers' experience, personality, and beliefs. Many factors in this domain have been captured in the existing literature, such as self-efficacy, motivation, and locus of control. In our study, we focused on the following three factors.

Work experience. Work experience was generalised as an additional factor in the literature review of De Rijdt et al. (2013) showing three reviewed studies in which novice teachers' positive transfer of learning was achieved. Furthermore, in the study of Jaramillo-Baquerizo, Valcke, and Vanderlinde (2019) novice teachers were more

eager to participate in professional development initiatives than experienced teachers, which then facilitated their transfer of learning. Based on these studies, it seems that teaching experience has a negative relationship with teachers' transfer of learning. In our study, work experience refers to not only vocational teachers' teaching experience but also their occupational experience in working life before becoming a vocational teacher. Although no research has investigated the linkage between vocational teachers' occupational experience and their transfer of learning, the current policies and studies have indicated that vocational teachers with occupational experience can provide their students with more knowledge and information about occupations. In other words, the occupational experience might be beneficial for vocational teachers' learning transfer. Thus, we added the following two hypotheses:

H2: Vocational teachers' teaching experience will negatively predict their transfer generalisation.

H3: Vocational teachers' occupational experience will positively predict their transfer generalisation.

Personal capacity. Personal capacity refers to the extent to which individuals have time, energy, and mental space in their work lives to make changes required to transfer learning to the job. In the Learning Transfer System Inventory (LTSI), personal capacity was found to be an important factor influencing individuals' learning transfer (Holton, Bates, & Ruona, 2000). For teachers, personal capacity is related to their workload in school, and a high workload always means a low personal capacity. Dreer, Dietrich, and Kracke (2017) explored in-service teachers' transfer of learning and found that teachers' capacity for transfer positively predicted their transfer readiness. Based on the above, we developed our fourth hypothesis:

H4: Vocational teachers' personal capacity will positively predict their transfer generalisation.

Perceived effects. Perceived effects describe the positive results of teachers' application of their learning in school. As it occurs after transfer generalisation, it has never been considered an influencing factor in those studies that only focused on transfer generalisation. Yet in a qualitative study, Zhou, Tigelaar, and Admiraal (2022b) found that perceived effects can be seen as a positive factor to promote vocational teachers to keep what they transferred from work placement to school. If we turn to

motivational theories, such as the reinforcement theory of motivation, perceived effects can be seen as a positive consequence that reinforces individuals to repeat their behaviours and performance (Gordan & Amutan, 2014; Skinner, 1958). Hence, we formulated our fifth hypothesis:

H5: Vocational teachers' perceived effects of transfer generalisation will positively predict their transfer maintenance intention.

6.2.2.2 Intervention design

Intervention design factors are focused on the setting characteristics of learning programmes. In the model of De Rijdt et al. (2013), many factors in this domain were displayed, such as need analysis, and learning goals. In the current study, we particularly focused on the following two factors that are related to the setup of vocational teachers' work placement.

Content relevance. Content relevance reflects the extent to which individuals' learning programmes are related to their daily work. In the context of work placement, content relevance refers to that what vocational teachers learned is linked to their teaching in school. In the review study by De Rijdt et al. (2013), content relevance was identified as the most common factor of the intervention design domain, which was mostly positively connected to the transfer of learning. Furthermore, Webster, Mîndrilă, and Weaver (2011) found that individuals' perception of content relevance was positively related to their transfer of learning through affective learning (learning that relates to students' interests, attitudes, and motivations). It seems that a high content relevance could facilitate teachers' learning transfer. Thus, we formulated a sixth hypothesis for our study:

H6: Vocational teachers' perception of content relevance will positively predict their transfer generalisation.

Work placement period. Time spent on learning is also a commonly identified factor influencing the transfer of learning. In many studies amount of learning time spent has been often used to measure teachers' learning engagement (e.g., Jansen in de Wal et al., 2014). In their literature review, De Rijdt et al. (2013) reported that the learning programmes crossing over time (one day with a time lag between the sessions, or more than two consecutive days) had a higher possibility to lead to a positive transfer of

learning than those one-time programmes (one hour/one day to two consecutive days). As prior studies have also found that the time spent on learning can promote individuals' learning achievements (Calafiore & Damianov, 2011), we added a seventh hypothesis:

H7: The learning period of work placement will positively predict vocational teachers' transfer generalisation.

6.2.2.3 School environment

A good transfer climate was seen as particularly important for the occurrence of a transfer of learning. In the model of De Rijdt et al. (2013), a limited number of factors in this domain have been classified, i.e., strategic link, transfer climate, support, opportunity to perform, and accountability. In our study, we mainly paid attention to the following three factors situated in the school environment.

Supervisor support. Supervisor support in our study refers to the assistance that teachers receive from their supervisors in school to apply what they have learned. In previous studies, supervisor support/leadership played an important role in implementing professional development for teachers and changing their teaching in school (Weiner & Lamb, 2020; Whitworth & Chiu, 2015; Winokur & Sperandio, 2017). For example, Fancera (2020) explored how school leaders applied social media and networking (SMN) for teachers' professional development, and the results reached that school leadership stimulates SMN use for professional development is beneficial for teachers to engage in the related platforms. Winokur and Sperandio (2017) showed that transformational leadership was positively linked to teachers' increased transfer of training to their classrooms. Based on this, we have developed another hypothesis:

H8: Vocational teachers' perception of supervisor support will positively predict their transfer generalisation.

Peer support. Peer support includes the assistance and appraisal received from colleagues. Prior research has revealed that many peer-support learning activities, such as peer observation, perform a positive influence on teachers' competencies and practice as well as student achievements (Hsieh et al., 2021; Jin et al., 2022). In addition, peer support in school has also played a critical role in helping teachers

improve their learning outcomes or transferring results from a teacher development programme. Both in the model of De Rijdt et al. (2013) and Holton, Bates, and Ruona (2000), peer support is seen as a vital factor influencing individuals' transfer of learning. Therefore, we formulated a ninth hypothesis:

H9: Vocational teachers' perception of peer support will positively predict their transfer generalisation.

Opportunity to use. Opportunity to use addresses whether teachers are provided with enough resources and space to apply what they have learned from learning programmes in school. In the review study of De Rijdt et al. (2013), opportunity to use was one of the most frequent work environment factors affecting individuals' transfer of learning. Since the context of work placement is different from the school workplace, opportunity to use may be an important factor influencing vocational teachers' transfer. Thus, we added another hypothesis:

H10: Vocational teachers' perception of opportunity to use will positively predict their transfer generalisation.

6.2.2.4 Moderating factors

Transfer period and perceived effects were added as moderating factors in our study. In previous studies, transfer of learning was measured with or without a time lag between the end of the intervention and the transfer measure, but differences in the transfer period have not been studied yet. Some scholars argue that a longer transfer period may produce a better transfer of learning, as it needs time to implement what has been learned. However, others assume that a shorter transfer period might be more effective for the transfer of learning because the implementation follows closer to the learning. Based on this, De Rijdt et al. (2013) encouraged future research to concentrate on time lag conditions (short and long-term time lag) as a moderating factor. And for perceived effects, since it describes how individuals assess the effect of the transfer that they have generalised and it occurs between transfer generalisation and transfer maintenance, it can help individuals to have a deep reflection on their generalised transfer and consider to what extent they would like to maintain their transfer. In a positive level of perceived effects, a high transfer generalisation may lead to a high transfer maintenance intention, while in a negative level of perceived effects, it can be possibly different. Therefore, although a positive prediction of

transfer generalisation on transfer maintenance was hypothesised in our study, it might be influenced by perceived effects. Then, we formulated the following two hypotheses: H11: Transfer period will moderate the relationship between influencing factors and vocational teachers' transfer generalisation.

H12: Vocational teachers' perceived effects of transfer generalisation will moderate the relationship between their transfer generalisation and transfer maintenance intention.

6.2.3 Our study

Previous work has concluded that transfer of learning is critical for understanding individuals' learning outcomes, and a series of influencing factors has been generated. Yet, the existing studies have several limitations. First, although transfer generalisation and maintenance have been identified as two main constructs, they are hardly examined together and the linkage between these two concepts has not been explored. Second, most factors that influence the transfer of learning were generated and examined in the field of human resource management. Yet, little is known about the field of teacher professional development. Third, studies only examined a small number of influencing factors. Fourth, the moderating effect on the prediction for transfer of learning was seldom addressed. Therefore, in our study, we would like to examine the factors predicting vocational teachers' transfer of learning. A general research question was eventually formulated, 'Which factors are related to vocational teachers' transfer of learning in the context of work placement?' The research model is shown in Figure 6.1 and, to sum up, the hypotheses are:

H1: Vocational teachers' transfer generalisation will positively predict their transfer maintenance intention.

H2: Vocational teachers' teaching experience will negatively predict their transfer generalisation.

H3: Vocational teachers' occupational experience will positively predict their transfer generalisation.

H4: Vocational teachers' personal capacity will positively predict their transfer generalisation.

H5: Vocational teachers' perceived effects of transfer generalisation will positively predict their transfer maintenance intention.

H6: Vocational teachers' perception of content relevance will positively predict their

transfer generalisation.

H7: The learning period of work placement will positively predict vocational teachers' transfer generalisation.

H8: Vocational teachers' perception of supervisor support will positively predict their transfer generalisation.

H9: Vocational teachers' perception of peer support will positively predict their transfer generalisation.

H10: Vocational teachers' perception of opportunity to use will positively predict their transfer generalisation.

H11: Transfer period will moderate the relationship between influencing factors and vocational teachers' transfer generalisation.

H12: Vocational teachers' perceived effects of transfer generalisation will moderate the relationship between their transfer generalisation and transfer maintenance intention.

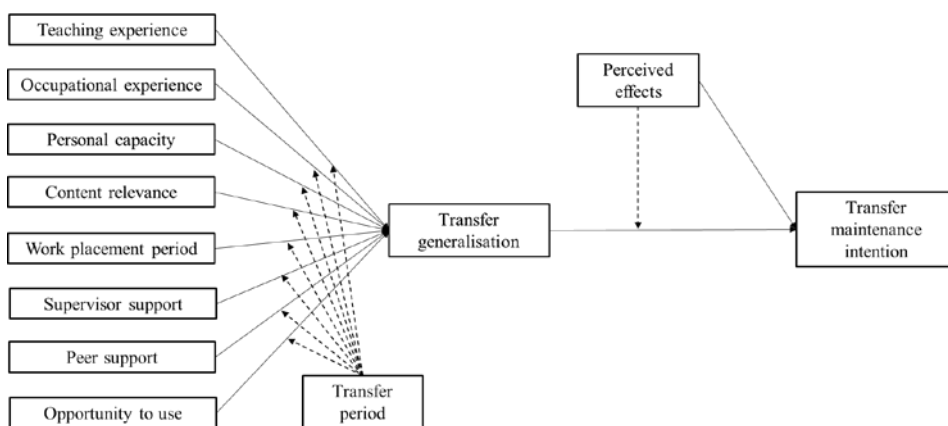


Figure 6.1 The research model of this study.

6.3 Method

6.3.1 Participants

The participants were 372 Chinese secondary vocational teachers, who taught students aged from 15 to 17 years. The background information details of the participants were shown in Table 6.1. There were 170 females and 202 males, aged from 22 to 59 years.

Most participants (around 86%) had attained a bachelor's degree or higher level of education. The average teaching experience of the participants was 14.49 in years (SD=9.289). And, more than 40% of the participants had occupational experience in the industry or society before becoming a vocational teacher. With regards to the experience of work placement, about 50% of the participants attended the latest work placement within the past half a year, while others attended it more than half a year ago. Furthermore, around half of vocational teachers had undertaken the latest work placement for less than one month, and others had more than one month. Moreover, a wide range of teaching subjects was reflected in the sample, such as hotel management, nursing, numerical control technology, and cooking.

Table 6.1 Demographic information of the participants.

Variables	Category	Frequency	Percent %
Gender	Female	170	45.70
	Male	202	54.30
Age	≤30	45	12.10
	31-40	189	50.81
	41-50	100	26.88
	≥51	38	10.21
Highest educational attainment	Diploma of secondary vocational school	1	0.27
	Senior college degree	31	8.33
	Bachelor degree	195	52.42
	Master degree	125	33.60
	Doctorate degree	20	5.38
Teaching experience	1-10	139	37.37
	11-20	153	41.13
	21-30	55	14.78
	31-40	25	6.72
Occupational experience	Yes	214	57.53
	No	158	42.47
Time for attendance in work placement	Less than half a year ago (from 2021.07)	189	50.81
	More than half a year ago (before 2021.07)	183	49.19
Period for work placement	< 1 month	184	49.46
	≥1 month	188	50.54

6.3.2 Data collection

The data was collected through an online survey using Qualtrics. We recruited vocational teachers in the following two ways. First, we made use of a public list of 2021 national work placement programmes for vocational teachers, which attached the contact information of the organisers from companies (Ministry of Education of the People's Republic of China, 2021). Specifically, we sent letters to the organisers of 73 work placement programmes on the list to ask them whether they would like to

help us to carry out this survey, and we received 25 responses with permission. Then, we requested those to send our survey invitation to vocational teachers who attended their work placement programmes in 2021. Second, we also utilised our network to collect responses. In particular, we asked for help from several principals of secondary vocational schools to give out questionnaires. It was explained to participants that participation was voluntary, and that the data would be kept confidential and would only be available for research purposes. Most teachers spent 10 to 15 minutes completing the questionnaire. This study acquired ethical approval from ICLON Research Ethics Committee with the number IREC_ICLON 2020-06.

6.3.3 Measures

The questionnaire used in this study was presented in Appendix E, and it contained two scales that separately aimed at measuring transfer of learning and related factors.

6.3.3.1 Transfer of learning

Transfer of learning was divided into transfer generalisation and transfer maintenance intention, which were measured with six items each. These items were developed based on the qualitative findings of Zhou, Tigelaar, and Admiraal (2021, 2022b), which focused on vocational teachers' changes in school practice after participating in work placement. There were three levels of transfer, including school, collegial, and individual teaching practice. The items of transfer generalisation and transfer maintenance were almost the same, except the former used past tense to ask participants to what extent they had made changes, while the latter used future tense to ask them to what extent they would like to keep changes. An example of transfer generalisation is 'I adapted my teaching content based on what I learned in this work placement.' and of transfer maintenance intention 'I will keep using the adapted teaching content in my class'. Teachers rated their agreement with each item, ranging from 1 ('It's not applicable to me at all') to 5 ('It's totally applicable to me') with 'neutral' serving as the midpoint. For each item of transfer generalisation, when participants choose '1', they were asked to skip the corresponding item of transfer maintenance intention. The average score of the items was used to present the extent of vocational teachers' transfer generalisation and transfer maintenance intention.

6.3.3.2 Independent factors

To measure the factors influencing vocational teachers' transfer of learning, we

employed the Learning Transfer System Inventory (LTSI), which was developed from the perspective of human resource development. Recently, LTSI has been updated to version 4, which includes 48 items within 16 factors (Bates, Holton, & Hatala, 2012). Until now, LTSI has been translated into more than ten languages and has been widely used in many countries. In our study, we utilised and adapted the items of five factors from LTSI to our context, including personal capacity, content relevance, supervisor support, peer support, and opportunity to use. Regarding another factor 'perceived effects', four items were developed based on the qualitative results of Zhou, Tigelaar, and Admiraal (2022b). The number of items and examples are shown in Table 6.2. Teachers rated their agreement with each item, ranging from 1 ('Strongly disagree') to 5 ('Strongly agree') with 'neutral' serving as the midpoint.

Table 6.2 The examples of factor items

Factor variables	Number of items	Item examples
Personal capacity	3	There is too much happening at school for me to try to use this work placement.
Content relevance	3	I like the way this work placement seems so much related to my school work.
Supervisor support	3	My school supervisor meets with me to discuss ways to apply this work placement in school.
Peer support	3	My colleagues at school appreciate my using what I learned in this work placement.
Opportunity to use	3	The resources needed to use what I learned in this work placement are available in my school.
Perceived effects	4	I found my job performance as a teacher improved because of my transfer from this work placement to my school.

Apart from the above-mentioned factors, there were also four demographic factor variables, i.e., teaching experience (years), occupational experience (years), work placement period, and transfer period. For the work placement period, '0' represents that the time spent in work placement is less than one month, while '1' represents more than one month. For the transfer period, '0' means that vocational teachers participated in work placement within the last six months and '1' means that they took

their work placement more than half a year ago.

6.3.4 Data analysis

6.3.4.1 Common method bias

Since we used one-time self-report items to investigate vocational teachers' transfer of learning and influencing factors, there might be a risk of variance that is attributable to the measurement method instead of to the constructs, which is called common method bias. Therefore, we conducted Harman's single-factor test by SPSS 26.0 to check the common method bias. All scale items except demographic information were imported to conduct exploratory factor analysis and were required to load on a single factor without rotation. The results showed that this single factor accounted for 43.685% of the total variance, which was lower than the cutting-off point of 50% (Harman, 1976). Thus, we concluded that the common method bias is not problematic in the current study.

6.3.4.2 Measurement model

To verify the reliability and validity of the latent variables, we gathered all corresponding items to conduct confirmatory factor analysis (CFA) with Mplus 8.3. The measurement model demonstrated an acceptable fit ($\chi^2 = 434.042$, $df=137$, $CFI=0.944$, $TLI=0.931$, $RMSEA=0.076$, $SRMR=0.056$). As shown in Table 6.3, all items loaded well on the corresponding factors (0.694-0.939). Depending on those item loadings, we also computed the composite reliability (CR) and convergence validity (AVE) of each factor, which showed a good fit ($CR>0.8$, $AVE>0.6$). The values of Cronbach's alpha for each factor were also calculated and all of them were above 0.8, which suggested a high internal consistency for the items in each factor. Moreover, we examined the discrimination validity of the variables. As shown in Table 6.4, the square root of the AVE of all factors (presented in bold) is larger than any correlation. Thus, the test of discriminant validity was acceptable.

Table 6.3 CFA factor loadings, validity and reliability of the latent variables and items

Variables	Items	Parameters of significant test				Item R-square	Composite Convergence			Cronbach's alpha
		Estimate	S.E.	Est/S.E.	P		Reliability	Reliability	Validity	
Personal capacity (PC)	PC1	0.763	0.027	28.756	***	0.582	0.870	0.692	0.868	
	PC2	0.857	0.022	38.867	***	0.734				
	PC3	0.872	0.022	40.316	***	0.760				
Content relevance (CR)	CR1	0.847	0.021	40.868	***	0.717	0.845	0.647	0.832	
	CR2	0.862	0.020	42.922	***	0.742				
	CR3	0.694	0.033	21.311	***	0.482				
Supervisor support (SS)	SS1	0.833	0.019	44.861	***	0.695	0.901	0.753	0.897	
	SS2	0.939	0.012	75.381	***	0.881				
	SS3	0.827	0.020	42.060	***	0.684				
Peer support (PS)	PS1	0.856	0.017	50.836	***	0.732	0.915	0.783	0.912	
	PS2	0.910	0.013	72.647	***	0.829				
	PS3	0.887	0.014	63.021	***	0.786				
Opportunity to use (OPP)	OPP1	0.763	0.025	29.904	***	0.581	0.859	0.671	0.857	
	OPP2	0.833	0.020	41.220	***	0.694				
	OPP3	0.859	0.019	46.215	***	0.737				
Perceived effects (PE)	PE1	0.815	0.020	39.912	***	0.664	0.903	0.699	0.902	
	PE2	0.825	0.020	41.905	***	0.681				
	PE3	0.877	0.016	56.214	***	0.768				
	PE4	0.825	0.020	41.863	***	0.680				

Table 6.4 Discriminant validity

	Personal capacity	Content relevance	Supervisor support	Peer support	Opportunity to use	Perceived effects
Personal capacity	0.831					
Content relevance	0.081	0.804				
Supervisor support	0.091	0.646	0.868			
Peer support	0.149	0.669	0.700	0.885		
Opportunity to use	0.212	0.777	0.676	0.793	0.819	
Perceived effects	0.144	0.677	0.639	0.797	0.774	0.836

6.3.4.3 Path analysis

To test the relationship between vocational teachers' transfer of learning and hypothesised factors, we firstly carried out a Pearson correlation analysis of all continuous variables through SPSS 26.0. Then, path analysis was carried out through Mplus 8.3 following our research model as presented in Figure 6.1. The path model showed a good fit: $\chi^2 = 593.935$, $df=229$, $CFI=0.941$, $TLI=0.929$, $RMSEA=0.065$, $SRMR=0.062$. Furthermore, moderating analysis was executed to examine the moderating effect of the transfer period and perceived effects. We used Process 3.0 in SPSS 26.0 to analyse the moderating effect of the transfer period and perceived effects.

6.4 Results

6.4.1 Descriptive statistics and bivariate correlations

In Table 6.5, descriptive statistics and correlations of all the measured continuous variables are reported. Among all independent scale variables, the mean score of vocational teachers' perception of opportunity to use was the highest, while supervisor support and personal capacity were the lowest. The correlation results show that almost all variables were significantly correlated, except for teaching experience. Most of the significant correlations were above 0.1, but no more than 0.8. But, the correlation between transfer generalisation and transfer maintenance intention was quite high (0.858).

Table 6.5 Descriptive statistics and Pearson correlations of all measured continuous variables

Variables	Mean	SD	1	2	3	4	5	6	7	8	9	10
1. Teaching experience	14.490	9.289	1									
2. Occupational experience	1.740	3.577	-0.095	1								
3. Personal capacity	3.314	0.859	-0.015	0.065	1							
4. Content relevance	3.723	0.646	-0.034	0.168**	0.088	1						
5. Supervisor support	3.445	0.786	-0.023	0.176**	0.059	0.587**	1					
6. Peer support	3.746	0.684	0.027	0.158**	0.117*	0.626**	0.652**	1				
7. Opportunity to use	3.910	0.583	-0.037	0.165**	0.173**	0.694**	0.598**	0.704**	1			
8. Perceived effects	3.798	0.585	0.039	0.156**	0.109*	0.633**	0.591**	0.729**	0.682**	1		
9. Transfer generalisation	3.812	0.619	-0.009	0.206**	0.225**	0.589**	0.522**	0.590**	0.598**	0.580	1	
10. Transfer maintenance intention	3.940	0.544	-0.072	0.199**	0.230**	0.565**	0.461**	0.591**	0.591**	0.586	0.858	1

Note: * p<0.05, **p<0.01

6.4.2 Main effect results

Based on the path analysis, we captured the relationship of our hypothesised factors with vocational teachers' transfer of learning. As shown in Table 6.6, vocational teachers' occupational experience had a positive prediction on their transfer generalisation, which means that teachers with more occupational experience reported more transfer from the work context to school. Besides, vocational teachers' perception of personal capacity, content relevance, peer support, and opportunity to use positively predicted transfer generalisation. Moreover, we also found a positive association between work placement period and vocational teachers' transfer generalisation. These factors explained 48.70% of the variance in transfer generalisation. Teaching experience and supervisor support were found to have no significant relation with transfer generalisation. With respect to transfer maintenance intention, we found that vocational teachers' transfer generalisation and perceived effects positively predicted their intention for transfer maintenance, with a 74.70% variance explained. In sum, except for H2 and H8, all hypotheses related to the direct relationship were supported.

Table 6.6 The results of path analysis

Independent variables	Transfer generalisation			Transfer maintenance intention		
	β	S.E.	R ²	β	S.E.	R ²
Teaching experience	0.014	0.038	0.487	-	-	0.747
Occupational experience	0.080*	0.041		-	-	
Work placement period	0.075*	0.049		-	-	
Personal capacity	0.132**	0.043		-	-	
Content relevance	0.216*	0.085		-	-	
Supervisor support	0.055	0.065		-	-	
Peer support	0.211**	0.082		-	-	
Opportunity to use	0.245*	0.105		-	-	
Perceived effects	-	-		0.160**	0.035	
Transfer generalisation	-	-		0.764**	0.027	

Note: * $p < 0.05$, ** $p < 0.01$

6.4.3 Moderating effect results

Moderating analysis was conducted to test whether transfer period moderated the relationship of all hypothesised factors on transfer generalisation and whether perceived effects moderated the relationship between transfer generalisation and transfer maintenance intention. As displayed in Table 6.7, the results show that there was no moderating effect of transfer period, which means that the association between all factors and vocational teachers' transfer generalisation keeps constant over time. Similarly, the moderating effect of perceived effects was not significant, which implies that no matter to what extent vocational teachers perceived the effects of their transfer, they would like to keep using what they have transferred to a stable extent. This means that H11 and H12 are not supported.

Table 6.7 The results of moderating analysis

Dependent variables	Independent variables	Independent variables and moderators	B	S.E.	P-value	LLCI	ULCI	
Transfer generalisation	Teaching experience	Teaching experience	-0.001	0.004		-0.008	0.006	
		Transfer period	0.013	0.065		-0.114	0.140	
		Interaction	0.011	0.007		-0.003	0.024	
	Occupational experience	Occupational experience	Occupational experience	0.036	0.009	**	0.019	0.054
			Transfer period	0.021	0.063		-0.103	0.145
			Interaction	0.014	0.018		-0.021	0.048
	Work placement periods	Work placement periods	Work placement periods	0.097	0.064		-0.030	0.223
			Transfer period	0.005	0.064		-0.122	0.132
			Interaction	-0.059	0.129		-0.313	0.194
	Personal capacity	Personal capacity	Personal capacity	0.168	0.037	**	0.095	0.240
			Transfer period	0.031	0.063		-0.093	0.154
			Interaction	-0.086	0.074		-0.230	0.059
	Content relevance	Content relevance	Content relevance	0.563	0.040	**	0.483	0.642
			Transfer period	0.002	0.052		-0.101	0.104
			Interaction	0.060	0.081		-0.098	0.219
	Supervisor support	Supervisor support	Supervisor support	0.411	0.035	**	0.342	0.480
			Transfer period	-0.008	0.055		-0.116	0.100
			Interaction	-0.007	0.070		-0.146	0.131
Peer support	Peer support	Peer support	0.538	0.038	**	0.463	0.614	
		Transfer period	-0.053	0.052		-0.156	0.049	
		Interaction	0.052	0.765		-0.099	0.202	
Opportunity to use	Opportunity to use	Opportunity to use	0.639	0.045	**	0.551	0.726	
		Transfer period	0.015	0.052		-0.087	0.116	
		Interaction	0.069	0.089		-0.107	0.244	
Transfer maintenance intention	Transfer generalisation	Transfer generalisation	0.687	0.028	**	0.632	0.743	
		Perceived effects	0.125	0.030	**	0.066	0.183	
		Interaction	0.018	0.032		-0.045	0.080	

Note: * $p < 0.05$, ** $p < 0.01$

6.5 Discussion and conclusion

Factors predicting the transfer of learning have been examined in previous studies (Burke & Hutchins, 2007; Cheng, 2016; Jackson, Fleming, & Rowe, 2019; Suleiman, Dassanayake, & Abang Othman, 2018). Our study examined the factors linked to vocational teachers' transfer of learning in the context of work placement from a quantitative perspective. The results showed that first, six factors positively predicted vocational teachers' transfer generalisation, i.e., occupational experience, personal capacity, content relevance, work placement periods, peer support, and opportunity to use. Second, vocational teachers' transfer generalisation and perceived effects positively predicted their transfer maintenance intention. Third, there was no moderating effect of transfer period and perceived effects on the above-mentioned predictions.

6.5.1 Factors predicting vocational teachers' transfer generalisation

Among the factors predicting vocational teachers' transfer of learning, we found that vocational teachers' perceptions of personal capacity, content relevance, peer support, and opportunity to use were positive predictors of their transfer generalisation, which were in line with most previous studies, in particular the comprehensive conceptual model developed by Holton et al. (1997). Our study provided strong empirical evidence on the relationship of these factors with the transfer of learning in this specific context of teacher professional learning. Moreover, a positive linkage between vocational teachers' occupational experience and transfer generalisation was also confirmed in our study, which was not yet explored before. This finding seems easy to be understood, as vocational teachers with occupational experience already have much experience in the transfer of learning from the industrial context to teaching in school, which may help them to transfer after participating in work placement. Regarding the learning period, our findings illustrated that a longer learning period led to a higher extent of transfer generalisation. Although a few studies in the review research of De Rijdt et al. (2013) investigated the effect of the learning period on staff transfer of learning, they were more focused on the consecutiveness of learning instead of learning duration. Therefore, our finding extends the insights into the linkage between time spent and transfer results.

Aside from the above-mentioned significant predictions on transfer

generalisation, a non-significant relationship between supervisor support with transfer generalisation was found, which differs from the prior work (e.g., Burke & Hutchins, 2007). The reason might be that most vocational teachers do not often receive supervisor support in their school context. This explanation can be supported by the descriptive statistics of our study, in which the mean score of supervisor support was much lower than the other factors except for personal capacity. Moreover, a non-significant prediction of teaching experience on transfer generalisation was also unexpected. As work placement differs from other teacher learning programmes, vocational teachers might be not so familiar with the context of work placement, which may lead them to some dilemmas for transfer, no matter whether teachers are novice or experienced teachers.

6.5.2 The prediction of transfer generalisation and perceived effects on transfer maintenance

Considering the relationship between transfer generalisation and transfer maintenance, our findings showed that vocational teachers' transfer generalisation positively and strongly predicted their transfer maintenance intention, which suggests that vocational teachers like to maintain what they have transferred from work placement to their teaching in school. To our knowledge, this is the first research to explore the relationship between these two types of transfer.

At the same time, the perceived effects were also discovered as a positive predictor of teachers' transfer maintenance intention, which means that teachers would like to keep using what they have transferred to school workplace when they perceive the positive effects of their transfer. Although this is a newly identified factor, it can be well explained by the motivational theories, in particular, the reinforcement theory of motivation (Gordan & Amutan, 2014; Skinner, 1958), which stated that a positive result could function as a reinforcement for individuals' persistence on performing this behaviour.

6.5.3 The moderating effect of transfer period and perceived effects

The results of our study found that the transfer period did not have a moderating effect on any relationship between transfer generalisation and its factors. This suggests that the influence of these factors on the transfer of learning keeps unaltered, even if

teachers followed work placement more than 6 months ago. This result enriches our understanding of how the time lag between programme completion and possible implementation in school of what teachers have learned. This finding is in line with the findings of Zhou, Tigelaar, and Admiraal (2021), who showed that most vocational teachers' transfer intentions were achieved after five months.

Similarly, we also clarified that vocational teachers' perceived effects did not moderate the relationship between transfer generalisation and their transfer maintenance intention. This demonstrated that no matter whether vocational teachers perceived effects of their transfer, they would like to maintain to apply what they had transferred. Both these two non-moderating effects reflect that the direct influence of work placement programme was quite strong.

6.5.4 Limitations

Although our study successfully examined the factors influencing vocational teachers' transfer of learning in the context of work placement, still, several limitations need to be addressed. First, only a self-report survey was employed in our study to measure the transfer of learning, which might have led to an overestimation of what teachers have transferred. Therefore, we suggest future research will investigate vocational teachers' transfer of learning in a more objective way, such as through personal observation. Second, we used cross-sectional data to analyse transfer generalisation and transfer maintenance. Although we have used different tenses in the questionnaire items, it might that this was not so evident for some participants. Therefore, a longitudinal survey will be welcomed in the future. Third, although we addressed the most relevant factors in our study, still some other factors were not included, such as personality traits, motivation, and need analysis. Thus, future studies might focus on other possible factors.

6.5.5 Implications

There are strong theoretical and practical implications of our study. Concerning the theoretical implications, the results of our study provided an overview of factors which may associate with vocational teachers' transfer of learning in a specific context of teacher professional learning. In particular, some new factors were tested, which enrich our current understanding of the transfer process. Moreover, the linkage between transfer generalisation and maintenance is presented, which stimulates future

scholars to use them to explore the transfer of learning. Besides, no moderating effect of the transfer period and perceived effects make us realise that the impact of work placement programmes could persist over time.

For practical implications, our study can provide suggestions for school leaders, programme designers, and other practitioners in vocational education to promote vocational teachers' transfer of learning from work placement to school workplace. Firstly, as vocational teachers with less occupational experience were found to report less transfer of learning, these teachers can be more supported in their learning process. Secondly, considering the positive linkage of work placement period with transfer of learning, the programme designers may consider prolonging the length of work placement programmes, and school leaders might provide vocational teachers more time to conduct their work placement. Thirdly, as a result of the positive relationship of peer support and opportunity to use with vocational teachers' transfer of learning, school leaders could think about how to meet the needs of teachers to apply what they have learned from work placement and how to encourage teachers within a team to collaborate with each other to support transfer of learning. Fourthly, given that teachers' personal capacity was a positive predictor of their transfer of learning, school leaders ought to explore ways to decrease vocational teachers' workload, which may increase their energy, time and mental space to transfer what they have learned from work placement to school.