Peer feedback in teacher professional development
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Chapter 4

Learning from Novice–expert Interaction in Teacher Professional Development

Abstract

Novice–expert interaction plays an important role in teacher professional development (TPD) for Chinese vocational education and training (VET). Both Chinese and international research shows that expert-teachers' support is associated with the improvement of novice-teachers' teaching. However, insights into how exactly novice teachers learn with the help of expert teachers are lacking. The learning processes of four novice VET teachers were explored in the context of a TPD project. Data were collected by semi-structured interviews with novice teachers and recordings of novice–expert interactions. A learning model was constructed based on the interconnected model of professional growth. The results showed that novice teachers internalised comments from expert teachers by active reflection and practice. Moreover, this study suggests that teacher learning through novice-expert interaction is a complicated long-term process, and that during their development the support from expert teachers is an important external source for novice-teachers. Expert-teachers' support not only provides feedback and suggestions for alternative teaching methods, but also encourages and maintains novice-teachers' learning. The results are discussed in relation to the Chinese cultural and VET context.

4.1 Introduction

In teacher professional development (TPD), the induction period is regarded as a crucial time that will greatly affect teacher retention. As shown by previous research, there is a high turnover rate in the first years of novice teachers (O'Brien et al., 2008; CentERdata, 2013; Alliance for Excellent Education, 2004). This situation might be caused by the gap between teacher education and teaching practice, also known as praxis shock (Veenman, 1984; Cole & Knowles, 1993; Stokking et al., 2003).

Similar to Western countries, in the context of Chinese vocational education and training (VET), the praxis shock of novice teachers may be more severe because of some special challenges caused by social and culture factors. From a cultural perspective, the reputation and social acceptance of vocational education is relatively low, because students and parents believe that vocational education is for lower social classes (Li & Xu, 2018). A survey on 320 VET students and 230 parents of VET students showed that 52.0% of students and 44.8% of parents believe VET has a lower status compared to regular secondary education (Gu, 2012). Besides, the Chinese VET system has been relatively separated from general education for a long time (Zhao, 2018). For students in Chinese vocational schools it is usually difficult to transfer to general secondary schools and they have a low chances to enrol in college. In this context, novice VET teachers may experience problems in motivating students, managing classrooms, adapting their teaching to a proper level, adjusting their expectation and understanding the background of their students (Ren, 2018; Ma et al., 2018).

In contrast, expert teachers are usually considered more proficient in teaching expertise. Borko and Livingston (1989) found that novice mathematics teachers showed more time-consuming planning, encountered problems when attempts to be responsive to students led them away from scripted lesson plans and reported more varied, less selective post-lesson reflections than experts. Meyer (2004) found that novice teachers hold insufficient conceptions of their students' prior knowledge, which expert teachers make better use of when giving instruction. A similar result was also found in Chinese vocational education. Expert VET teachers appear to have more well-structured knowledge, more automated general pedagogical skills and stronger beliefs in their career than novice teachers (Zhao, 2010). Therefore, TPD projects with novice–expert interaction are widely used to promote novice VET teachers' learning in China, such as expert teacher workshops (Yang, 2013) and teacher apprenticeships (Shao & Zhou, 2013). Moreover, in Chinese culture

relatively more respect is shown for older people, and people believe senior colleagues are more skillful and proficient. This is also an important context of those novice-expert-interaction-based programmes.

The effect of these TPD programmes might be supported by some literature on the topic of teacher mentoring. For instance, Carter and Francis (2001) found that collaborative, reflective novice–expert relationships in the workplace were tightly associated with novice-teachers' positive experiences and TPD. Moreover, novice–expert interaction in mentoring is also an important factor affecting novice-teachers' retention and professional identity (Ingersoll & Kralik, 2004; Smith & Ingersoll, 2004; Shields & Murray, 2017). However, little research has focused on how novice teachers actually learn from experts in TPD programmes. This knowledge is important for optimizing novice-teachers' professional development programmes.

To enrich previous research and contribute to future TPD programmes, this study aims to provide an in-depth look into the learning process during novice–expert interactions.

4.2 Novice-teachers' learning

Novice-teachers' learning can be framed in the literature on the problems novice teachers meet, their interactions with expert teachers as a support of their learning and a more general model for teachers' professional growth.

4.2.1 Novice-teachers' problems in the context of Chinese vocational education

In many countries, research on teacher turnover has found a universally high attrition rate among novice teachers. Every year, 207,000 novice teachers (around 6%) do not return to teaching in their second year in the US (Alliance for Excellent Education 2004). In an Australian study, 29% of teachers were thinking about leaving teaching, and 10% indicated they had already made the decision to leave by the second year of teaching (O'Brien et al., 2008). Similarly, 66.7% of Chinese secondary school teachers are not satisfied with their jobs, and there is a significant negative correlation between their job satisfaction and turnover intention ($r = -0.67$, $p < 0.001$). More detailed statistics in this study showed that teachers younger than 46 years old have a significant higher turnover intention ($F = 9.782$, $p = 0.000$) when compared with their senior peers (Liu et al., 2010).

This serious turnover situation may be closely related to problems that novice teachers meet in their workplace, such as deficiency of administrative support, poor school climate, behavioural problems of students, absence of peer support networks, job dissatisfaction, a potential better career in a different work domain and not being able to use effective teaching strategies and so on (Ingersoll, 2001; Stockard & Lehman, 2004; Andrews et al., 2007; Alliance for Excellent Education, 2004; Ingersoll & Smith, 2003). The problems of novice teachers may even be more severe in VET schools.

In a study by Chen and Xu (2011), VET teachers were asked if they would like to teach in a general secondary school instead of VET schools if they were given the opportunity; 79.0% of them (n = 558) reported positively and stated that the higher salary, better social reputation, better work environment and opportunities to achieve self-worth in the general secondary schools were important reasons for this. The absence of these factors may also result in teacher burnout. A survey of 294 Chinese VET teachers showed that 33.2% of them reported extreme job burnout, 51.1% strong job burnout and only 15.7% almost no job burnout (Zhang & Ding, 2011). A detailed analysis in this study showed that the main factor causing the burnout of novice teachers is emotional exhaustion, which may be caused by students' misbehaviour and novice-teachers' lack of classroom management skills. The findings implicated that the problems VET teachers encountered may result from the low status VET has in Chinese schooling system, in addition to a lack of particular teaching skills. Thus, how novice teachers can cope with the unique VET environment may be another important issue besides their learning to teach. To support the development of novice–expert VET teachers in China, many novice–expert interaction-based TPD projects are carried out, and many studies provide empirical evidence of the positive effect of these projects.

4.2.2 Novice–expert interaction as a support of teacher learning

In a report for the Education Commission of the United States, Ingersoll and Kralik (2004) located 150 empirical studies of induction and mentoring programmes, and reviewed 10 studies in detail. The report concluded that mentoring programmes have a positive impact on new teachers and their retention. Another study showed that novice teachers who were supported by mentors are less likely to move to other schools and less likely to leave the teaching occupation after their first year of teaching (Smith & Ingersoll, 2004). In addition, research also showed that mentoring can affect novice-teachers' professional identity. For instance, a case study based on

semi-structured interviews with preservice teachers and their mentors showed high levels of confidence and development of teacher voice by the end of their practicum, which indicated that a positive mentoring relationship is related to the change of preservice teachers' identity (Izadinia, 2016b). Shields and Murray (2017) also found that the legitimacy of novice teachers recognised by mentors positively influences the development of beginning teachers' professional identities. Besides mentoring, other novice–expert interaction-based activities in China also proved to be useful in developing novice-teachers' professional expertise by means of activating reflection on their teaching by, for example, lesson evaluation and lesson observation (Li, 2009; Cui, 2012).

Since the support of expert teachers is widely believed to be productive in promoting novice-teachers' learning, a detailed inquiry on how novice teachers learn from expert teachers is relevant and necessary. Previous research provided some insights into novice-teachers' learning in the context of novice–expert interaction. For instance, challenging traditional hierarchical relationships, involving a commitment to collaborative, inquiry-oriented approaches towards mentoring, risk-taking within the classroom, the mentor teachers' use of constructive feedback and 'mentoring-down-the-hall' are all considered as important learning approaches in mentoring (Attard-Tonna et al., 2017; Bentley et al., 2017). However, these learning approaches cannot fully answer the question of how novice teachers learn with the help from expert teachers. To answer this 'how' question, an integrated model of teacher learning is needed to explicate the change of novice-teachers' cognition and behaviours, instead of discussing learning approaches, activities and effects separately.

4.2.3 The interconnected model of professional growth

A frequently cited model of teacher learning is the interconnected model of professional growth (IMPG). Clarke and Hollingsworth (2002) built this model based on Guskey's model of the process of teacher change (Guskey, 1986) and stated that teacher learning occurs in a mediating process of 'reflection' and 'enactment' through four distinct and also interrelated domains: 1) the personal domain (teacher knowledge, beliefs and attitudes); 2) the domain of practice (professional experimentation); 3) the domain of consequence (salient outcomes); and 4) the external domain (sources of information, stimulus or support). Change in any domain will result in changes in other domains, as shown in Figure 4.1.
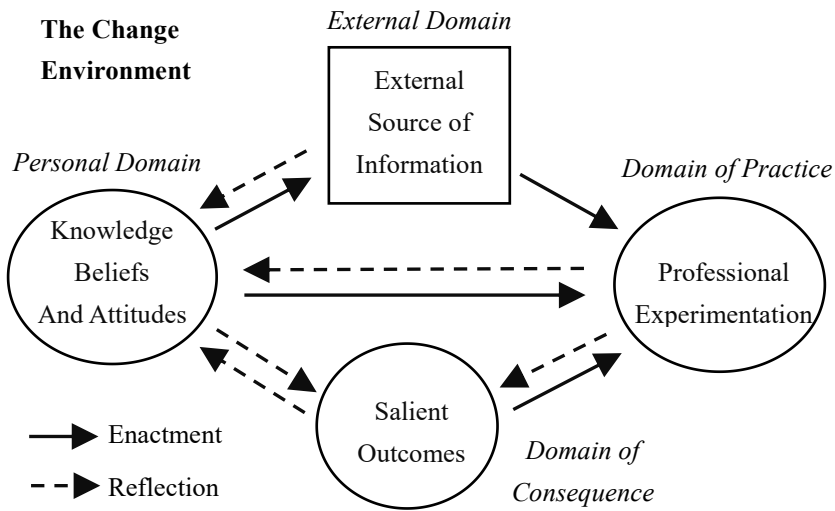
**The Change
Environment**

External Domain

Personal Domain

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External
Source of
Information
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Domain of Practice

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Knowledge
Beliefs
And Attitudes
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Professional
Experimentation
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```
Salient
Outcomes
```

*Domain of
Consequence*

→ Enactment

--▶ Reflection

Figure 4.1. The interconnected model of professional growth
From Clarke and Hollingsworth (2002). p. 951

In this model, 'enactment' refers to implementing a new idea or a new belief instead of simply acting. The 'reflection' is derived from Dewey (1910), which means 'active, persistent and careful consideration'. By analysing these two mediation approaches within domains, teacher learning processes in different contexts can be explained (Witterholt et al., 2012; Justi & van Driel, 2006). Furthermore, some more specific patterns of teacher learning were revealed by adapting the IMPG in the context of reciprocal peer coaching (Zwart et al., 2007). Zwart et al. (2007) included reciprocal peer coaching as a main part of the external domain, and also added teaching practice and teaching preparation in the domain of practice. The IMPG can also be used in this study for a better understanding of how the external domain (learning source from expert teachers) interacts with novice-teachers' individual professional domains (personal domain, domain of practice and domain of consequence). However, the IMPG model mainly focuses on the change between domains, which hinders a more detailed elaboration of changes within a specific domain. Therefore, in this study, changes in novice-teachers' teaching beliefs and behaviour within the personal domain and domain of practice are investigated in more detail.

Thus, the aim was to develop an integrated and specific model of teacher learning in a novice–expert interaction-based TPD project in the context of Chinese

vocational education. According to this goal, our research question is formulated as:

● How can novice-teachers' learning in novice–expert interaction be characterised in the context of Chinese vocational education?

4.3 Method

4.3.1 Context of the TPD project

This research was carried out within the Standard Training Programme for Novice Vocational School Teachers in Shanghai (China). This is an annual programme developed and organised by the Shanghai Municipal Education Committee and the Institute of Vocational Education and Training of Tongji University (Shanghai, China). The programme is aimed at promoting the development of novice VET teachers. The novice teachers who participated all submitted an application. The expert teachers are paid by local government to participate, and they play the role as an outsider providing expert feedback and comments, instead of a daily mentor in novice teachers' school. All the expert teachers are certified by the Shanghai Municipal Education Committee, for which they have to have at least 10 years of teaching experience and be examined by both their schools and local education committee. There were 62 novice teachers and 32 expert teachers participating in the year 2015 when we collected the data. All the novice and expert teachers were divided into 10 groups according to the subjects they were teaching, and every group usually consisted of six novice teachers and three expert teachers.

Within the training programme, the novice and expert teachers would have three sessions (about once a month) to discuss their teaching with expert teachers, usually at the school of the novice teacher. Every novice teacher was required to present different forms of lesson presentations of his/her own teaching in every session (e.g. teaching video, lesson plan and classroom teaching). A group of expert teachers then give feedback and have a conversation with every single novice teacher after their presentations. An informal assessment form is used by the experts to make notes when listening to novice teachers, which consists of seven categories: 1) language and manner; 2) teaching goals; 3) teaching content; 4) teaching method; 5) using of technology and media; 6) achieved goals; and 7) teaching features. However, this form is not sent to novice teachers and is just for expert teachers to make notes, and expert teachers share their opinions with novice teachers orally.

4.3.2 Participants of the study

Based on previous observations of the participated novice teachers in the Standard Training Programme for Novice Vocational School Teachers in Shanghai (China), six novice teachers who are active participants of the programme were invited to participate in this study. Four of them accepted to be interviewed after completing the programme (see Table 4.1). Participants' names were anonymised and replaced with aliases.

Table 4.1 Information on participants

Name	Gender	Years of teaching experience	Subject
Wendy	Female	1	Chinese language
Emma	Female	1	Chinese language
Tina	Female	1	Moral education
Sarah	Female	3	Moral education

Note: The moral education usually combines four modules: 1) career planning; 2) professional ethics and law; 3) politics and societies; and 4) philosophy and life.

4.3.3 Data collection

To explore the specific learning of novice teachers in the novice–expert interaction, two kinds of data were collected: 1) audio recordings of three novice–expert interactions from each novice teacher (12 recordings in total); and 2) an interview with each novice teacher.

First, before the interaction session, a lesson of each novice teacher was videotaped. During the first session, experts watched and discussed the video together with the novice teacher who presented her teaching video, which took about one hour for every novice teacher. Second, after around four weeks, the second session was organised, in which novice teachers gave a short presentation of their teaching plans for around 15 minutes, then the expert teachers and novice teachers discussed the plan for about 40 minutes. Third, the last part of the project concerns classroom teaching. The expert teachers went to the school of every novice teacher and sat at the back of the classroom to observe novices' teaching. After the class, they had a conversation with the novice teacher for about one hour.

After the novice teachers finished all three sessions, they were interviewed by the first author. In all cases: 1) the interview took place in an empty classroom or office with the participant and the interviewer only present; 2) the interviews lasted between 50–70 minutes; 3) the interviews were audio recorded with the novice teacher's permission; and 4) the transcript of the audio tape was sent to the interviewees (novice teachers) for member checking.

4.3.4 Interview procedure

According to Minichiello, Aroni and Hays (2008), the interview outline of a qualitative research should be open-ended to get as much information as possible from the interview. To gain a specific understanding of novice-teachers' learning, our interview started with a general question "please recall the most impressive lesson you learned in the project and describe how you learned it" (see Appendix B for the interview outline). Novice teachers were asked to answer the question by telling a story which should include at least: 1) what comments they got from expert teachers; 2) how they thought about the comments at that moment; 3) whether they decided to change; and 4) whether these changes were kept in their daily teaching. If the interviewee did not give a detailed account, we asked follow-up questions such as "Since you said you accept their advice, then what do you do in your daily teaching in the same situation?" After having gathered the necessary information, a new round of questions would start with the question "Is there another impressive things you learned in the conversation with experts beside what we just talked about?" This procedure was repeated, and in general, two or three storylines were collected for every one hour interview.

To ensure reliability and protect the privacy of respondents, some criteria were set and also used as guidelines for collecting the data: 1) asking permission before interview and recording, and respondents have the right to stop the recording if necessary. It happened once when we were interviewing Tina, she asked to stop for several minutes when she complained about the negative attitude of her school principal towards teachers' participation in TPD projects; 2) ensuring that respondents fully understand the purpose of the research, and emphasise that the recording of interviews is only for research purposes; 3) interviewed teachers are anonymous throughout the whole research, and their names are replaced with English ones; 4) the transcripts of the interviews and the results of this research was sent to the respondents, asking for their comments and feedback to avoid misunderstanding of their interview.

4.3.5 Data analysis

After data collection, all 16 audio recordings (one interview and three novice–expert interaction sessions for each novice teacher) from four novice teachers were transcribed into text, and then it was sent to participants for member checking. The transcribed text of all 16 recordings included 81,520 Chinese characters in total. After the transcription, two independent researchers read these texts and marked segments closely related to the research questions (i.e. sentences which may indicate what and how novice teachers learn). Data analysis was mainly based on grounded theory (Glaser et al., 1967; Strauss & Corbin, 1990). However, some sensitizing concepts (e.g. teacher change, sense making, teacher knowledge and reflective teaching) were present prior to data collection. These were chosen based on the authors' previous observation of similar TPD programmes and knowledge of learning theories. These sensitizing concepts are constantly adjusted and refined throughout the analysis.

Three coding steps were involved in the analysis. The first step was open coding. The researchers read through the transcription and then labelled the text into 217 units referring to the different meanings. A unit consisted of a few sentences, a short paragraph or a phrase on one single topic. All the units were named by words or short sentences based on summarising the text. Later, these units were generalised into 51 primary concepts.

The second step was axial coding, comparing the meaning of all 51 primary concepts of teacher learning, and then generating them into 15 main concepts grouped into four categories. Table 4.2 shows the final categories and concepts with a short description in the right column. The transcribed data and coding table were sent to three Chinese associate professors in educational science, and were discussed and revised three times until all agreed. Since the analysis was primarily data driven, most concepts in the table came from the data. Exceptions were the concepts under the category 'Comments/advice from expert-teachers', which were named after the teacher knowledge framework (Grossman, 1990), because the four kinds of knowledge fitted the data. To match the actual process of teacher learning, our data coding may refer to different levels of abstraction.

Table 4.2 Data encoding and definition of concepts

Categories	Concepts	Definitions
Comments/ advice from expert teachers	General pedagogical knowledge	Knowledge of broad principles, strategies, teaching and learning theories that are not subject-specific.
	Knowledge of context	Understanding of the communities, regions, schools, classrooms and students in the country they live.
	Subject matter knowledge	Knowledge of the professional subject a teacher teaches, which contains syntactic structures, substantive structures and content.
	Pedagogical content knowledge	Knowledge of how to teach specific content in specific contexts, which includes: conceptions of purpose for teaching subject matter; knowledge of students' understanding; curricular knowledge; and knowledge of instructional strategies.
Sense making	Acceptance	Novice teachers accepted advice of expert teachers without doubt, which will directly lead to the 'trail'.
	Cognitive differences	Novice teachers have different points of view or different teaching methods to experts.
	Reflection	An effort to reconcile the expert comments and their original cognition or behaviour.
Adapting practice	Neglect	The novice teachers reject the advices from expert teachers for some reason.
	Re-assumption	Repeated construction of better teaching based on the analysis of expert-teachers' comments and novice-teachers' own situations.
	Trial	Experimenting with the new assumption proposed by novice teachers or advice provided by expert teachers.
	Feedback	The result of the trial.

Table 4.2 (Continued)

Categories	Concepts	Definitions
	Teaching concepts	Novice-teachers' new ideas and understanding of themselves as a teachers, their students and teaching.
	Teaching competences	Basic principles of how the novice teachers should perform in the class, including teaching manners, wording and interaction with students.
Learning outcome	General strategies	Strategies that can be widely used in many different situations without a deep analysis of the characters of students and teaching contexts.
	Emotional experience	The change of novice-teachers' feelings about themselves, students and teaching, which may promote their intention of continuous learning.

Third, the last step was selective coding where the researcher integrated these concepts and categories into one system based on consequences of events as described by Strauss and Corbin (1990). This meant that concepts were ordered according to the storyline of novice teachers. To illustrate the coding process and the outcomes of this process, an example is included in Table 4.3. The fragment relates to an answer to our interview question 'Please recall the most impressive lesson you learned in the project and describe how you learned it' from Tina. Tina teaches on the moral education course in her first year. She was very positive and received quite some help from the expert teachers.

As shown in Table 4.3, eight codes were used in the open coding phase and were grouped into six concepts and four categories in the axial coding phase. After all the concepts and categories were defined, they were ordered by their consequences and function in the processes. In this example, teacher Tina's storyline gives a clear clue of the comment she received from the expert teachers (a1), how she thought about the comments (a2, a3), what she actually did (a4, a5) and what happened after she performed some changes (a6, a7, a8). Therefore, a connection was built as 'comments of expert teachers (a1) to cognitive differences (a2) to reflection (a3) to trial (a4 and a5) to feedback (a6 and a7) to learning outcome (a8)'. However, this connection only showed the specific learning process of Tina in her specific situation; a more general learning model will follow in the results section.

Table 4.3 An example of the coding process

Categories	Concepts	Sub-concepts	The statement of a novice teacher
Comments/ advice from expert teachers	General pedagogical knowledge	Lack of pedagogical knowledge (a1)	Tina: "As many experts mentioned a lot, a common phenomenon in moral education is <u>sermon (a1)</u>. That means the lesson is not connected to students' life, but it's like preaching a sermon. However, it's just my <u>ability and habit (a2)</u> … how to draw my lessons into practice is still hard for me. I am <u>thinking about this problem and keep trying (a3)</u> since the first session … For example … To relate your lesson to students, you have to know your students better, the background, and their lifestyle and…hmm…just <u>weigh them up (a4)</u>. As a head teacher of a class, I have the opportunities to observe my students … Recently many students play the game Minecraft, I don't like playing computer games, but I still downloaded and tried this game just for <u>understand my students better (a5)</u>. Although I'm not interested in it, but I will try to understand it, and when we talk about it, there would be <u>something special between me and my students (a6)</u>. Students will think that their teacher also plays the same thing with them and <u>our relationship would be drawn closer (a7)</u> … It <u>helps me a lot to hold a class meeting and give lessons (a8).</u>"
Sense making	Cognitive differences	Ability and habit (a2)	
	Reflection	Self-reflection (a3)	
Adapting practice	Trial	Knowing students (a4), (a5)	
	Feedback	Teacher-student relationship (a6), (a7)	
Learning outcome	Teaching competence	Interaction (a8)	

4.4 Results

In order to characterise the learning of novice teachers, the research results will be presented in this section in three parts: 1) the model of novice-teachers' learning in novice–expert interaction; 2) the advice or comments expert teachers provided in this TPD project; and 3) the learning outcomes of novice teachers. These three parts elaborate the process, input and output of teacher learning, respectively. It can be

supported by the Presage-Process-Product-model of teaching and learning (Biggs, 1996).

4.4.1 Learning model

Based on the coding of the interviews, we related all the categories and concepts to construct a model to characterise novice-teachers' learning in the novice–expert interaction-based TPD project (see Figure 4.2). Learning model in this section means the micro-process of teachers' change of behaviour and cognition in novice–expert interaction, which could be regarded as an adaptation of the IMPG in our context. It gives insight into how teachers change within their personal domains and the domain of practice instead of showing how different domains are related to each other.

Comments/advice from expert teachers

Sense making

Cognitive differences   **Acceptance**

Reflection
（Is the suggestion acceptable?）

Yes   No

Adapting practice

Re-assumptio   **Neglect**

No

Feedback ◄ **Trial**
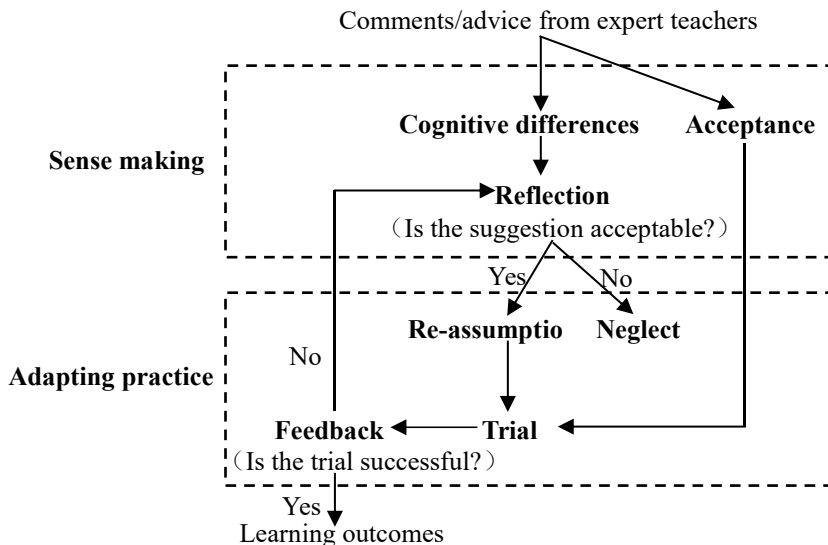（Is the trial successful?）

Yes
Learning outcomes

Figure 4.2 The learning model in novice–expert interaction

Comments and advice from the expert teachers could be regarded as the external domain in the IMPG framework. After being advised by expert teachers, firstly, new teachers need to decide what to do with the comments or advice. There are two typical choices from our observation and analysis: acceptance and cognitive differences. If novice teachers directly accept the suggestions, they have to try it in the future in order to trigger 'learning'. If novice teachers do not fully agree with expert teachers, they experience a kind of cognitive difference, which leads to

reflection on why they hold their different views. Then, they have to decide what to do next. Emma was suggested to have more interaction and discussion with her students. However, in our interview she reflected:

> "I think this advice is good, but I just can't do that now because I don't have as much experience as they (expert teachers) do … I may lose control of them (students) when they are too active, and they may say something improper … I guess I can do that spontaneously as I develop."

It shows how Emma reflects on the gap between the expert-teachers' implicit expectations and her own capacity. The cognitive differences here refer to different views and understanding of teaching, and reflection includes how novice teachers explain the differences, and then decide how to deal with the different opinions from experts. This phase is named 'sense making', based on the previous research on teachers' attitudes towards reform (Coburn, 2001; Coburn, 2005; Schmidt & Datnow, 2005; Luttenberg et al., 2013). It shows some similarities with the personal domain of the IMPG, because both involve teachers' knowledge, attitudes and beliefs, which actively interact with the information from the external domain.

The learning process, in the phase of adapting practice, could be regarded as the elaboration of how the domain of practice changes. This phase begins with the decision coming from the sense making phase, and when novice teachers choose to accept a new idea, the learning process would turn into this phase. The core of this phase is 'trial', the main task of novice teachers is trying out alternative methods and revising their teaching. Each trial starts with an assumption like 'It would be better to …', 'Better teaching should be like …', and after their trial, they will check the feedback they get to decide what to do next. After novice teacher Wendy tried a new way in the introduction of her lesson, she said: "… The most crucial experience is my interaction with students who are much more engaged than before". Since the feedback was positive, Wendy kept this new method in her daily teaching, which means the teacher learning progressed from the domain of practice to the domain of consequence. However, if the result of their trial is negative, they have to reflect and re-assume it again, which leads to a new learning cycle. The process for one particular comment ends with a successful trial or a comment that is neglected.

4.4.2 Expert-teachers' comments and advice

In order to have a broad view on the input of this TPD project, we used the framework of teacher knowledge (Grossman, 1990) to categorise the different

comments given by expert teachers (See Table 4.2).

General pedagogical knowledge

The results showed that novice teachers need help with general pedagogical knowledge, just as Tina once said, "At the beginning, I did not know how to give a lesson, and I was trying to imitate what my teachers do in class when I was a high school student". In order to solve the problems novice teachers encountered, much advice on general pedagogy was given. For example, Wendy accepted a suggestion about teaching design, "There's only 40 minutes for a lesson, you cannot use so many examples to explain a topic. You should reduce some cases, but explicate only one case deeply". In the aspect of student learning, experts suggested to Sarah that, "You can put some homework ahead. Let students do something before the class as a preview, instead of leaving all home work until after a lesson. So you can discuss their home work in the class and know where their problem is".

Knowledge of context

In the transcriptions, we found that expert teachers comment a lot on novice-teachers' knowledge of context because of the special situation of Chinese VET education. The knowledge and background of students are frequently discussed in the novice–expert interaction. When analysing Wendy's problem, an expert mentioned that:

> "One of the major problems most young teachers may have, I think, is that the track of growth is so different between you and your students in vocational schools. Our young teachers may have successfully graduated from elementary schools, high schools, and then universities, so when they go to vocational schools and be with the children there for the first time, they will naturally think their students are just like them … when novice teachers teach in a class, they think the lesson they arranged is easy and simple enough for their students, but that's not true … Our children in vocational schools usually grew up in a bad environment, many of them are tired of school, careless, lack of confidence … you need a long time to adapt to your students, and think from their position."

Subject matter knowledge

The subject matter knowledge was also discussed in the novice–expert interaction. For example, when teacher Sarah was giving a lesson called 'Egoism and altruism',

she arranged the lesson in a different order than suggested by the expert teachers. The novice teacher uses the textbook to substantiate her choice, saying:

> "I taught in the order of the text book. The principle that people should not do anything that harms others is set out for the students firstly. Then the reasons follow, which are related to the social attributes of humans."

An expert pointed out:

> "The arrangement of the text book is its own matter. You should realise that the social attributes of humans are actually not the reason for helping people, it's a philosophical framework that should come first, and then the practical level … the choice of being egoistic or altruistic … and I think it would be better not to have an absolute principle in your class."

Through this dialogue, we can see that the expert's understanding of the subject knowledge has gone beyond the textbook, and their own subject matter knowledge is actively involved when arranging a class.

Pedagogical content knowledge

In the process of the TPD project, less comments are found on promoting new teachers pedagogical content knowledge (PCK) than expected, which may because PCK is difficult to teach through providing advice. However, we did observe the PCK of expert teachers when they expressed their own understanding of giving a good lesson. For example, in a moral education course titled 'Participating in Political Life', an expert mentioned:

> "I'm not sure if most of your students understand what "political life" is … I think if you have a better insight of the concept "citizenship", you will find that every one of us can participate in managing public affairs... So his course should help students to explore the relationship between us and the government, and learn students this sense of responsibility for society, which is just what students in vocational schools need … knowing their responsibility as a citizen can transfer into the responsibility for their own lives …"

Through this discussion, we can see that experts pay more attention to students' understanding, and set their own goals for this course based on the understanding of VET students and subject matter. Although novice teachers may understand the

expectation behind the dialogue from the expert, it can be difficult for novice to conduct similar adaption in their teaching because of inadequate knowledge on VET students and subject content.

4.4.3 Learning outcomes

The results concerning novice-teachers' learning outcomes can be found in Table 4.4. The category learning outcome is divided into four concepts and 12 sub-concepts. Each concept was illustrated by a statement of a novice teacher.

Table 4.4 Learning outcomes from novice–expert interaction

Concepts	Sub-concepts	Statements of novice teachers
Teaching concepts	Reframe teaching Self-reflection Understanding students	Sarah: "I used many cases in my class, some of them could be removed, and I should focus on only one or two cases to make a deep explanation for my students."
Teaching competences	Teaching manner Wording Interaction	Wendy: "I pay more attention to motivate my students now … Once I was so focused on finishing my lesson, sometimes I was eager and impatient. I answered my own questions and concluded for my students… (Now) I try to wait my students after I propose a question, and I try to have more discussion with them on their answers."
General strategies	Writing lesson plans Arranging teaching process Re-constructing teaching material	Emma: "Give students choice … I think this suggestion impressed me a lot … They (expert teachers) told me to set multiple choices instead of asking open questions … so even if students don't know the answer, they can still guess it and learn by comparing four choices."
Emotional experience	Career identity Feeling towards students Passion for teaching	Tina: "Through the conversation with experts, I was encouraged, and I realised my potential for teaching, I hope I can keep being a teacher in the future."

Teaching concepts

Teaching concepts, in this study, are defined as the change of novice-teachers' knowledge and beliefs, and consists of three sub-concepts. First of all, the sub-concept 'reframe teaching' means that teachers re-recognised teaching, and had a new understanding of how to manage a classroom, guide students and deal with classroom problems and so on. Second, the sub-concept 'self-reflection' refers to what teachers think of their role in a class. It involves the teacher's basic teaching principles, which belongs to pedagogical knowledge in Grossmans' framework. Finally, the third concept 'understanding students' means that teachers gain more knowledge about the background of students, including the family status of the students, the cognitive level of the students and the psychological condition of the students, which is mainly about the knowledge of context.

Teaching competences

There are also three sub-concepts included within the concept of teaching competences: 1) teaching manner refers to the body language and behaviour in their teaching; 2) wording is about the way a novice teacher expressed the teaching content and the words and sentences used to explain their topic; 3) interaction refers to the criteria of how a teacher should interact with their students.

Teaching competences are similar to pedagogical knowledge, but more general. Although most novice teachers learned some teaching skills, the novice teachers found it difficult to enact all the skills they learned, due to their lack of experience. For example, in a lesson presentation, Tina asked a student to answer her question by calling the seat number. An expert immediately pointed out, "You must remember that you should never call your student's seat number, which makes me feel you are calling a prisoner in jail, and you really need to remember the name of every student in your class". Later, the expert teacher shared some tips on how to remember many students' names in a short time. Although the lack of teaching competences happened for every novice teacher in this programme, it is easily improved, because it is operable and technical. Tina also mentioned the rule of 'remembering students' names' when we interviewed her, and she claimed that she never called students by their seat number again after that.

General strategies

General strategies refer to basic teaching strategies, especially those that can be used

in different classes and do not require an analysis of teaching situations. The strategies novice teachers reported to be learned were quite technical and straightforward; Complicated suggestions from expert were more likely to be neglected. This may be explained by the teachers' knowledge framework. A creative and specific strategies often involves a rich practical knowledge, thus the more complex a teaching strategy is, the more PCK is needed to handle the strategy.

In this study, many general strategies are found in the advice given by expert teachers. For example, the expert teachers told almost every novice to "put some questions ahead before your teaching to guide your students' thinking, and students will be stimulated by interesting questions". Such a strategy is relatively universal and does not require consideration of many complex conditions. New teachers can grasp and imitate this strategy quickly. In the interviews, some novice teachers did confirm that they use this way to start their teaching in daily work.

Emotional experience

Emotional experience is a more unique type of learning outcome because it is actually not the ability of novice teachers, and it can be hardly explained by teacher knowledge. It is merely a perceptual expression of participation in this TPD project. The reason why emotional experience is regarded as a learning outcomes here is because many novice teachers believe that the change of their attitude and feeling is also an important benefit they get from this project. Moreover, emotional experience is tightly related to teacher's professional motivation, which may aid in continuing teachers' further study and improvement over a period of time.

Emotional experience can be triggered by encouragement from the expert teacher. As a novice teacher mentioned in an interview, "being approved by the expert teachers is really necessary for us, because we encounter so much frustration in our classroom". Besides, new insights of teaching and students may also have a positive influence on novice-teachers' emotional experience, as mentioned by Sarah:

> "I used to regard one of my students as the typical vocational one, who is rebellious and uncooperative, but after discussing with them (expert teachers), I think I know my student better and I guess our relationship would be better if I am more sensitive to his needs."

4.5 Discussion and conclusion

In this research, we studied novice-teachers' learning processes in novice–expert interaction at a micro level and developed a model that describes how novice teachers change. To answer the research question, "How can novice-teachers' learning in novice–expert interaction be characterised in the context of Chinese vocational education?" Chinese VET teachers' learning in novice–expert interaction could be characterised in the following steps: 1) comments and advice from expert teachers; 2) acceptance or cognitive differences; 3) reflection; 4) re-assumption; 5) trial; 6) receiving feedback; and 7) learning outcomes. This model provides insights into how novice teachers make sense and change their teaching with the help of expert teachers. This learning model can be understood as an interpretation of the IMPG model (Clarke and Hollingsworth 2002) for the Chinese VET context. The IMPG model shows how the external domain (expert teacher) affects the personal domain (novice teachers) and the domain of practice (novice-teachers' trial). The model of the current study specified changes within each domain. Moreover, the Chinese vocational environment is also embodied in the current model by the detailed explanation of novice-expert dialogues. For example, the model shows that only 'acceptance' and 'cognitive differences' are observed, after novice teachers are informed by expert teachers, but no direct refusal. This may be caused by the Chinese culture of respecting senior people. Novice teachers in this context always provide a reason for refusing suggestions from experts to show that they have considered their opinion seriously.

4.5.1 Implications for professional development of novice teachers

The unique value of this study is that it highlights the function of expert teachers in the professional growth of novice teachers. In this study, novice teachers usually respect the advice and comments of expert teachers, and they see feedback from expert teachers as important external resources for improving their teaching. Moreover, the input of expert teachers makes novice-teachers' learning more intensive and active than learning from their daily work. When novice teachers reflect on their teaching, they usually focus on their effectiveness as a teacher (Borko & Livingston, 1989), which may hinder their reflection on their students' learning and other situated factors. Expert teachers offer more information about alternative teaching methods and feedback about the classroom.

Given the importance of the support of expert teachers, some standards can be

set for expert teachers to optimise the novice–expert interaction. For instance, the experts may align mutual expectations about the interaction, attune to the novices' emotions and adapt the interaction session to novice-teachers' reflective capacity (van Ginkel et al., 2016). The mentioned activities may decrease the cognitive differences novice teachers have towards the advice of experts. Additionally, the organisers of TPD projects are supposed to provide more opportunities for novices and experts to communicate with each other in both formal and informal ways, such as arranging the session time and location according to participants' schedule and creating online communities.

In the current study, novice teachers reported as learning outcome more general strategies and emotional experiences than comprehensive practical knowledge. This suggests the value of novice–expert interaction is not just passing on knowledge to novice teachers, but stimulating, maintaining and giving feedback to novices' practice, which may help novice teachers survive for the first years. This conclusion is consistent with the findings of previous research which shows that mentoring of novice teachers by expert teachers lowers the dropout rate of novice teachers (Ingersoll & Kralik, 2004; Smith & Ingersoll, 2004). This would mean that in a novice–expert interaction-based TPD project support from an expert may be more important than the knowledge they have. Learning of novice teachers is a slow and complicated process. All the learning outcomes from novice–expert interactions need be practised, polished and finally fixed to novice-teachers' own teaching experience.

4.5.2 Limitations

A first limitation is the small scale of our study. The four participants were female and taught general subjects, i.e. Chinese language and moral education. However, the gender and the subjects VET teachers teach may affect the content of novice-expert conversation rather than the learning process, which is the main focus of this study. The learning model developed in this study provides a framework of how novice VET teachers in general make sense of and change their teaching based on expert-teachers' feedback. In the novice-expert interaction, unique problems novice teachers encountered in the Chinese VET context were discussed. These conversations seem to contain information novice VET teachers need in their initial year of teaching.

A second limitation of this study is the planning of the interviews directly following the TPD project. This means that we could not examine how novice

teachers adapted their daily practice to the advice and comments provided by expert teachers after the project ended. Therefore, we suggest future research concerning more long-term effects of this TPD project.

4.5.3 Concluding remarks

Although this study was carried out in the context of a TPD project of VET novice teachers in China, the newly developed learning model might also be used to explain leaning in novice–expert interactions in general schools. However, the input (comments and advice of expert teachers) and output (learning outcomes) of this model may be a bit different when applied to general education. Topics such as handling noisy classrooms, motivating students, attracting students' interest and building a lesson on students' vocational expertise might be more specific for vocational education than for general education. In closing, TPD is a complicated long-term process, and during their development, the support from expert teachers is an important external source, which not only provides active feedback and alternative teaching methods but also encourages and maintains novice-teachers' learning.