

Informal Learning in Chinese TVET Teachers' professional development: models and factors

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ABSTRACT

Informal learning plays an important role in teacher professional development. Yet how Technical and Vocational Education and Training (TVET) teachers conduct informal learning and what factors influence the informal learning of TVET teachers remain unclear. The authors interviewed 12 TVET teachers from Chinese vocational schools about their informal learning in their daily work and life. Based on the coding of interview transcriptions, Chinese TVET teachers' informal learning behaviours can be categorized into four models: autonomous learning, supportive learning, collaborative learning, and shared learning. Moreover, this study identified three types of factors affecting the informal learning of TVET teachers: individual factors, organizational factors, and institutional factors. The findings provide a deep understanding of TVET teachers' informal learning and implied suggestions for future teacher development programmes.

Keywords: vocational education; informal learning; TVET teachers; qualitative analysis

1. INTRODUCTION

There is a growing awareness that what teachers learn in formal professional development initiatives is insufficiently transferred to their daily practice of teaching (Kyndt, Gijbels, Grosemans, and Donche 2016; Fraser 2010). Therefore, informal learning in the workplace is becoming more and more important to teacher professional development (TPD). Compared with formal learning, informal learning is more flexible, abstract and easily influenced by context (Galanis, Mayol, Alier, and García-Peñalvo 2016). It promotes the sharing of knowledge among colleagues and reflections on one's actions (Holmgren and Sjöberg 2022). Out of formal structures, teachers can decide what and how they learned based on everyday demands arising out of their teaching work, so they can benefit from various activities they undertake during their work time (Rodriguez-

Gomez, Ion, Mercader, and López-Crespo 2020). Influenced by the culture of collectivism in China (Zheng, Shen, and Yin 2018; Zheng and Zhang 2015), TPD is heavily reliant upon joint efforts, which leads to differences in Chinese teachers' perceptions of the learning environment and self-construction.

In China, especially in the field of Technical and Vocational Education and Training (TVET), it is urgent to play the role of informal learning in the workplace to promote the TPD. Most Chinese TVET teachers go straight to work after college (Jin, Tigelaar, Want, and Admiraal 2022), thus they have little cognition about vocational schools. To some extent, informal learning is the main way for them to integrate professional knowledge into the culture of vocational schools and be capable of being a TVET teacher. Exploring the effect of informal learning on TVET teachers' growth helps us better understand the learning process that occurs at their workplace, and more importantly, it promotes us to reflect on the learning environment and support conditions of teacher development programmes (TDPs). Previous studies have explored teachers' informal learning under the culture of individualism, but it seems different from collectivism. Thus, the current study is to reveal TVET teachers' informal learning process and influencing factors within the context of collectivism in China. On this basis, we try to construct typical models of Chinese teachers' informal learning.

2. LITERATURE REVIEW

2.1 Teacher professional development

'Teacher professional development' is one of the most popular concepts in the field of contemporary teacher education research. It means teachers' learning which includes how they learn to learn and how they apply their knowledge in practice to support pupil learning (Avalos 2011), whether it is pre-employment or post-employment. In the context of China, the purpose of TPD is not only for teachers' learning and growth but also to make teachers more adaptable to their work obligation. Zhu (2014) divided the professionalism of teachers into three dimensions: teaching students to learn, conducting moral education, and serving society. Therefore, Chinese researchers especially emphasise the commitment of teachers as professional workers. In general, school is the best arena for the further development of teachers (Postholm 2012) because real work in school can help teachers develop their practical knowledge and practical wisdom. In this process, some informal activities become the main carriers for teachers to obtain professional development in their work.

2.2 informal learning in the Chinese TVET context

Formal learning, non-formal learning, and informal learning are internationally recognised as three basic types of teacher learning. Informal learning is defined as implicit, situational, and unstructured learning that happens without direct reliance on a teacher or an externally-organised curriculum (Livingstone 2001). Many researchers have explored the classification of informal learning (Noe, Tews, and Marand 2013; Daniel 2000). Gradually, informal learning has received extensive attention in the field of workplace learning and adult education. It was widely used to promote post-service development and lifelong growth of individuals (Huang and Wang 2021; Kortsch, Schulte, and Kauffeld 2019; Noe, Tews, and Marand 2013), and so is it for teachers. There have been some researches on the activities and influencing factors of teachers' informal learning. Hoekstra, Brekelmans, Beijaard, and Korthagen (2009) summarise teachers' informal learning activities into the following categories: 1) learning by experimenting; 2) considering their own teaching practice; 3) learning by getting ideas from others; 4) learning by doings. Teachers initiating informal learning activities depend mostly on their desired content of the learning (Lecat, Raemdonck, Beausaert, and März 2019). Encinar-Prat and Sallán (2019) listed a series of informal activities of novice University professors, including four individual activities and three interactive activities. As for influencing factors, prior research has confirmed four environmental inhibitors to teachers' informal learning in the workplace (Lohman 2000). Grosemans, Boon, Verclairen, Dochy, and Kyndt (2015) found that teaching experience and school culture have an important effect on the informal learning of teachers. Richter, Kunter, Klusmann, and Lüdtke (2014) found there is an obvious contrast between novice and experienced teachers' informal learning. School climate and psychological capital are also regarded as influencing factors in teachers' informal learning (Huang and Wang 2021). From the literature, we found that the existing classification of informal learning activities was based on the analysis of teachers' active and individual learning behaviours. It might have been due to cultural differences. Teaching is a profession with a lot of autonomy in Western countries. The informal behaviours of teachers are dominated by themselves. In places with collectivist cultural traditions like East Asia, teachers

may have different informal learning behaviours.

Furthermore, these existing researches concentrated more on the teachers in primary and middle school, and the objects of studies rarely involved TVET teachers. Compared with primary school teachers or University Professors, TVET teachers need to face students who get low scores in academic lessons, a more cross-border working environment, and practice-oriented teaching (Zhuang 2021). Therefore, TVET teachers' learning and development in the workplace need to consider the characteristic of students in vocational schools. Significantly, the sources of TVET teachers are very diverse in China. Some TVET teachers, who graduated from comprehensive universities, have good foundations of professional knowledge. But they need to accept some formal training in teaching theory and methods after being a teacher. And another part of teachers graduated from teacher education universities and command basic professional knowledge, skills, and pedagogical knowledge. In recent years, more and more TVET teachers are introduced from enterprises, who have a good master of professional skills. The diversity of sources means that teachers in vocational schools would have different learning intentions, which requires the diversified design of development paths for those teachers.

In sum, in the context of collectivism, the mechanism of informal learning to TVET teachers' professional development as a crucial learning form in the workplace has not been clearly defined. Therefore, the main purpose of this study is to summarise several models of informal learning of TVET teachers in China and describe the learning process concretely. At the same time, we need to find out the factors influencing their informal learning to discuss how to provide good conditions to support TVET teachers' informal learning.

Therefore, the critical questions of this study are:

- 1) How do vocational education teachers conduct informal learning in China?
- 2) What factors influence the informal learning of vocational education teachers?

3. METHOD

3.1 Participants

To study TVET teachers' informal learning, we randomly contacted several teachers from different vocational schools. Before the formal interview, we gave each participant a piece of oral information about the content and design of the study and then obtained their informed consent. In the end, 12 TVET teachers were invited to participate in this study. Table 1 shows the characteristic of the respondents. The teachers were all anonymised.

Table 1 Characteristics of the participating teachers.

Name	Educational background	Teaching Experience	Teaching subjects	Working experience in enterprise
Yves Bernard	Master's degree	Five years	Marketing	No
Alva	Master's degree	Two years and a half	International business	No
Cornell Esther Zoe	Bachelor's degree	Three years and a half	Electronic technique/mechanical drawing	No
Matt	Master's degree	Two years	Hotel services	Yes
Cliff	Master's degree	One year	Child care	No
Gwendolyn Beacher	Bachelor's degree	Three years and a half	Mechanical technique	Yes
Nigel	Master's degree	Two years	Tourist service and management	No
Susanna	Master's degree	One year	Hotel services	No
	Bachelor's degree	Two years	Landscape design	Yes
	Bachelor's degree	Seven years	Mechanical engineering	No
	Master's degree	Ten years	Business English	No
	Master's degree	Two years	Politics	No

3.2 Data collection

We had a semi-structured, in-depth interview with 12 teachers, which consists of three parts: 1) We made a comprehensive inquiry about the content of the teacher's work, and every interview usually started with a general question, e.g., 'What are the main parts of your work as a teacher?' and 'what do you need to study to be better competent for your job?'. 2) We set a series of questions to let interviewers recall concrete situations and processes of their learning events that happened in their work. Some typical follow-up questions were: 'What kind of learning activities (including individual or team) do you usually have at work?' and 'Did you encounter any difficulties in teaching and how you solved them?'. 3) We asked whether there are some challenges or opportunities in their learning process to analyze the factors influencing their informal learning. Each interview lasts around 40 minutes to an hour. After that, we transcribed all the 12 audio recordings.

3.3 Coding procedures and analysis

To answer the research question, thematic analysis and Nvivo.11 were conducted to analyze the transcribed interview. The coding and analysis of the 12 interviews were carried out according to the following steps: 1) Label the transcribed text. In this step, we labelled all the phrases or short sentences that express teachers' learning activities and influencing factors in teachers' informal learning. 238 analysis units were labelled throughout the entire transcripts. 2) Generate categories. We merged labels that represent similar informal learning activities and influencing factors. After five discussions and adjustments with co-authors, 14 types of learning activities and 10 influencing factors were finally generated. 3) Group categories into domains. In a further discussion among the co-authors, we summarised 14 types of learning activities into four types of learning models according to the aspects of motivation, behaviours, participants, and results. In the same way, the influencing factors are further classified into three domains.

4. RESULTS

4.1 TVET teachers' informal learning models

In table 2, we provided an overview of the four models and 14 informal learning activities, with an example for each learning activity. The main informal learning behaviour of each activity will be illustrated through these examples.

Table 2 Learning models of Chinese TVET teachers.

Models	Learning activities	Examples
Autonomous learning	Deliberate learning	Alva: "Deepen my understanding of academic tests by doing exercises" Yves: "Read industry reports to keep abreast of industry trends"
	Observation	Susanna: "Observe what is happening in the workplace consciously" Bernard: "Collect real-life stories and make them into teaching cases"
	Reflection	Yves: "Review their performance in the class and adjust teaching design according to students' feedback in class"
	Communication	Gwendolyn: "Understand students' learning foundation and habits through talking with students" Cornell: "learn changes in posts and use of new equipment from staff in an enterprise"
Supportive learning	Mentoring	Esther: "Be instructed polish the teaching design over and over again".
	Master teacher studios	Matt: "Reflect on and revise plans step by step under the supervision of master teachers"
Collaborative learning	Competition	Matt: "Participate in teaching ability competition"
	Projects	Matt: "Follow experienced teachers to do some research projects"

	Collective lesson preparation	Esther: "Complete the teaching design and teaching materials according to the division of labour"
	Heterogeneous forms for the same subjects	Zoe: "Prepare the same lesson into different teaching designs"
Shared learning	Demonstrative public lessons	Beacher: "Listen to public lessons which are of high quality"
	Collective lesson plan presentations	Susanna: "Show the orientation, objectives, contents, implementation, evaluation, and reflection of courses I am going to teach"
	Transdisciplinary integration	Nigel: "Communicate with teachers from different specialities"
	Self-regulated workshop	Gwendolyn: "Share one's own experience of teaching and students management by giving a lecture or writing some informal essays on the WeChat official account"

4.1.1 Autonomous learning

Autonomous learning means the process in which teachers independently set learning goals, look for learning resources, take a series of learning ways, and finally obtain continuous changes in their knowledge, skills or socialization. It consists of four main activities: 1) Deliberate learning, which generally occurs based on teachers' definite learning motivation and awareness of their essential shortcomings. TVET teachers often set aside time and effort to improve their professional skills and educational theory. 2) Observation is the main way for novice teachers to adapt to the working environment as soon as possible. TVET teachers need to bring some cases from life into class because the understanding abilities of vocational school students are not very good, so they usually notice the details of life. 3) Reflection, which mainly happens when teachers reflect on the classroom and their learning of skills. TVET Teachers usually transform the skills they have learned or are learning into teaching content in class consciously, which is feedback on self-learning. 4) Interaction. TVET teachers also like getting ideas and experiences from the people they talk with, such as students, peers, and some corporate personnel. TVET teachers must keep advanced in professional knowledge and learn a set of coping strategies which are appropriate to students in vocational schools to make the students more adaptable to work. In the model of autonomous learning, teachers often combine 'clear learning goals' and 'clear work-based goals' (Euart 2004) together to plan their study. Teachers' cognition of their work and career plan is reflected in this learning process, thus learning behaviours of this model show great individual differences. Beier, Torres, and Gilberto(2017) also confirmed that autonomous learning is influenced by individual occupational beliefs and available resources.

4.1.2 Supportive learning

In addition to individual guidance, informal learning of TVET teachers depends on the help of others in many cases. We describe fixed, long-term assistance as a form of supportive learning. This model contains two main activities: 1) Mentoring. Many novice teachers said that when they meet some tough issues that they can't handle by themselves, they would search for help from their mentors or experienced teachers. In China, mentors are willing to share their classroom and teaching materials with apprentice teachers. 2) Master teacher studios, which aim at bringing excellent teachers' superiority into full play in TPD. Every teacher who participates in the master teacher studios must formulate a detailed personal development plan, including the list of expected outcomes and the time to complete the plan. Supportive learning is often used in novice teachers' informal learning, such as transferring experience to them.

4.1.3 Collaborative learning

Collaborative learning refers to a group of teachers gathering together to work toward a common goal and they are mutually reinforcing in the process. In this learning model, every participant has a clear division of labour. It comprises four main activities: 1) Competition, 2) Projects, 3) Collective lesson preparation, and 4) Heterogeneous forms for the same subjects. These competitions and projects mainly involve curriculum development or teaching methodology refining, which are important parts of teachers' work. Teachers' collective lesson preparation organises teachers who teach the same and similar lessons to study syllabus and textbooks together, then all participants prepare to teach plans together periodically. Susanna mentioned that even if we determined the content of each chapter of the course through collective presentation and discussion, teachers also assembled after class to share the teaching practice information and students' feedback. 'Heterogeneous forms for the same subjects' is a typical problem-orientated activity which aims to promote

new teaching concepts or experiment with new teaching methods. It's an effective way to compare different teaching ideas and methods. In summary, every TVET teacher in collaborative learning will have emotional communication, information transmission, knowledge sharing, and plan-making with group members as the main participants of the activity.

4.1.4 Shared learning

Sharing is a special informal learning model in China, which is usually organised actively by teachers in vocational schools. This model is like a process of large-scale experience transmission, in which many teachers act as listeners and observers to capture some practical knowledge according to their demands. The biggest difference between sharing learning and collaborative learning is whether the participants have participatory practice. This model comprises four activities: 1) Demonstrative public lessons, 2) Collective lesson plan presentations, 3) Transdisciplinary integration, and 4) Self-regulated workshop. The first and second activities are organised regularly with general goals, like updating teachers' concepts of vocational education and teaching methods. In China, teachers' classroom is not a secret garden, reversely, it needs to be open to the public. Vocational schools and local educational departments arrange many demonstrative public lessons of different specialities every semester. Collective lesson plan presentations, which are often launched by a speciality leader, are aimed at helping teachers to clarify their teaching intention. Apart from these, transdisciplinary integration and self-regulated workshop are both special activities. The former one, which is often initialised by staff from the regional educational department, is devoted to making up for teachers' shortcomings in one aspect and cultivating teachers' mindset of transboundary. For example, the staff from the educational department in Nanjing found that the teachers from the speciality of clothes design in vocational schools lacked aesthetics. Then she organised a weekend trip and invited several teachers from both specialities of clothes design and art to join. During the trip, teachers from both specialities learn from each other and many creative ideas were generated. The Self-regulated workshop is usually launched by some experienced teachers online.

4.2 The factors that influence TVET teachers' informal learning

Table 3 indicates three types of influencing factors which may enhance or hinder the informal learning of TVET teachers. These influencing factors can be specifically extended into 12 indicators.

Table 3 Influencing factors of informal learning.

Types of factors	
Individual factors	Educational and working backgrounds
	Subjective initiative
	Career planning
Organizational factors	Leadership
	Working atmosphere
	Organizational division of labour
	Speciality resources
Institutional factors	School-based teacher development programmes
	School's professional title system
	Regional cultivation system for TVET teachers

4.3.1 Individual factors

Individual factors mean the personal characteristics of the learner, including education and work background, subjective initiative, and career planning. Firstly, Teachers from different education and working backgrounds has different learning emphasis when they dominate autonomous learning activities. Teachers who graduated directly from schools and have no working experience in their professional field attach great importance to updating their professional knowledge. They seize every opportunity to communicate with industry experts whom they meet on some public forums or get acquainted with through school works. Teachers who come from enterprise feel relaxed in lesson preparation but they found it difficult to adjust to the difficulty of the class. Therefore, they need to think more about how to teach. We also found that a higher level of educational background or working experience can bring more social interaction resources to teachers. As Matt mentioned: "As I have a master's degree and some experience in academic research, many teachers would invite me to participate in their projects and hope to team with me in teaching competitions. Also, the school would give me more opportunities to learn from others. Because of these, I could accumulate some

interpersonal relationships in a short time.”

Except for this, subjective initiative and career planning are important facilitators of TVET teachers' self-directed informal learning. Teachers who want to become good teachers would accumulate more teaching strategies and focus on students' feedback. Teachers who want to become speciality leaders would improve their theoretical level consciously. But in our interviews, many novice teachers said that they didn't have clear career planning and didn't know whether some of their existing efforts were correct or not. On this occasion, a good mentor is particularly important. Because a good mentor is not only good at providing instructional support, but also a model who pursues effective professional growth through a variety of means (Rowley 1999).

4.3.2 Organizational factors

The organizational factors, which determine the environments of informal learning, were also considered in this research. Specifically, it contains leadership, working atmosphere, organizational division of labour, and speciality resources. Among these, leadership is the most critical factor. Because there are many special informal activities in China needing strong planning. A good leader can take on the role of a facilitator in informal learning activities. But the premise is that the speciality leader is willing to spend time listening to the lessons of every member of the organization and knows well about every member. Some of the interviewed teacher complained that their leader only focuses on the achievement of work indicators, and ignore the personal development of each member.

Working atmosphere and colleague relationships determine whether they can learn from others' experiences. Among these interviewed TVET teachers, what they discuss most in the office is students' anecdotes and transactional work, they won't discuss the plan of personal development and the problems they meet in teaching. Thus, they can only acquire a little experience in the management of students from colleagues' interaction. Esther said: “The seats of teachers' offices in my vocational schools are not arranged based on speciality, this would lead to less interaction among teachers from the same office.” The organizational division has a profound impact on the occurrence of teachers' informal learning. In our study, experienced teachers have more informal learning opportunities than novice teachers because novice teachers were extremely busy with too many administrative and temporary tasks.

Finally, teachers have different opportunities for informal learning due to the different organizational resources of different specialities. Some key specialities with good foundations will provide many hidden resources for teachers' informal learning, such as access to the industry forefront. Even if belonging to the same speciality category, the allocation of speciality resources varies greatly. The two interviewed teachers, named Cornell and Cliff, who separately come from Hotel Service and Tourism Service and Management under the same speciality category, had significant differences in access to informal learning. Cornell often leads students in the preparation for skills competitions so that she can meet many experts and judges who can provide lots of professional guidance in her work.

4.3.3 Institutional factors

The institutional factors include the school-based teacher development programmes, the regional cultivation system for TVET teachers, and the school's professional title system. Firstly, the school's professional title system is a unique teacher incentive system in China, which is closely related to the motivation and goal of teachers' informal learning. It is related to the promotion of teachers. The indicators of professional titles' appraisal often determine the motivation of teachers' informal learning. Although the sources of TVET teachers are very diverse, the standards of professional titles' appraisal are unified. Due to the strong emphasis on essays and awards related to teaching, TVET teachers are usually utilitarian. They spend much time learning to write essays and polishing texts for teaching competitions but neglect to improve the quality of the class. Secondly, the school-based TDPs refer to a series of items which push and supervise teachers' engagements in teaching and research, such as mentoring, regular public lessons in schools, and random attendance in the classroom. These items effectively enhance teachers' interaction with their peers, speciality leaders, school executives, and outside experts. But in practice, it depends on schools' strategies for talent development and normative systems for teachers' development. Although all the schools we investigated have similar TDPs, some are formalistic and not taken seriously by school managers. This is particularly evident among novice teachers. In the interview, some novice teachers are very satisfied with their growth in the school, while some novice teachers reflect that they have not received substantial help. Similarly, some regional training and development activities have also enhanced the communication and cooperation among teachers from different schools and specialities.

5. DISCUSSION AND CONCLUSION

The main contribution of this qualitative research was that we summarised four main informal learning models including 14 typical informal learning activities. We also reported three domains of influencing factors and revealed how these factors affect Chinese TVET teachers' informal learning process. Based on these findings, we discuss three main points.

5.1 The Characteristics of Chinese TVET teachers' informal learning: collective responsibility

The four models generated in our study are 'autonomous learning', 'supportive learning', 'collaborative learning', and 'shared learning'. Except for autonomous learning, the other three models are all produced in the teaching culture of collectivism. In China, teaching is regarded as a shared and collective responsibility (Zheng and Zhang, 2015), which is quite different from the western teaching culture of individualism, presentism, and conservatism. Thus, cooperation between Chinese TVET teachers' informal learning process is very common. Lohman (2006) confirmed that teachers rely to a greater degree on collaborative than on independent informal learning activities. Significantly, such cooperation is often planned and organised. This result is supported by previous research. Noy, James, and Bedley (2016) showed these activities are organised within an institutional context. Many informal learning activities in China (such as collective lesson preparation and collective lesson plan presentations) are organised in groups with specific goals for the development of teachers' teaching abilities. Although these collective teaching research activities are organised informally, they are becoming the daily behaviour of Chinese teachers.

In addition, we found that even in informal settings, teachers' participation in certain organizations (such as master teacher studios) or activities (such as collective lesson plan presentations) was compulsory. It is not based on the subjective willingness of teachers, so they often do not have a clear motivation for these activities. But Zheng, Zhang, and Wang (2019) recognised the role of the master teacher studios in the professional development of teachers. They thought that although teachers are involuntary participants at the beginning, they will gain new insights by participating in these activities. Therefore, this finding can be regarded as a unique contribution of collectivism to teachers' informal learning.

5.2 Different informal learning outcomes and their effects on TVET teachers' professional development

In terms of TPD, what have teachers learned from informal learning is important. This study indicated that TVET teachers' informal learning outcomes not only show teachers' growth in explicit skills but also indicate how TVET teachers' daily implicit learning behaviours influence TPD.

Firstly, in terms of explicit learning outcomes, TVET teachers are keen to push themselves to improve their teaching skills and vocational skills in their respective fields in order to make their teaching content keep up with frequent job changes. Kyndt et al. (2016) divided teachers' learning outcomes of informal learning into three main areas: subject knowledge, pedagogical knowledge and skills, and professional attitudes and identity. In this study, teachers often consolidate their subject knowledge by themselves and enhance their pedagogical skills through collective informal activities.

Secondly, the four models bring many incidental learning outcomes, especially some emotional outcomes. Through some collective interactions, new members build values and beliefs of becoming a TVET teacher unconsciously. This can be seen as a process of socialization which describes a turning point in TVET teachers' understanding of teachers' roles and themselves (Lortie 1975). Jin et al. (2021) interpreted this as an outcome named 'emotional experience'.

Thirdly, the focus on teachers' informal learning caters to the change of the mainstream paradigm of TPD, specifically, a shift toward a learning paradigm (Wu 2017). From the examples of TVET teachers' informal reflection and interaction activities, we can find that these teachers not only pay attention to teachers' teaching but also focus on students' learning. Especially for vocational education, teachers should support students' authentic and functional learning (Säde-Pirkko, Asko, Marja, and Pirkko 2015) to help students acquire specific skills. Therefore, teachers' informal learning activities in China will focus on how the teacher adapts to students' learning situations.

5.3 Ecology of informal learning of Chinese TVET teachers: support and hindrance

In the current study, we found that teachers' strong subjective initiative and their striving for excellence enhance teachers' motivation to engage in informal learning, especially novice teachers. This has been confirmed in the research of Zhang, Admiraal, and Saab (2021), who took teachers' teaching experience and

self-efficacy as important factors for teachers' motivation to participate in professional learning.

Consistent with previous studies, the work atmosphere was shown to be an important factor in informal learning at the workplace. 'Learning-friendly' organisational culture was crucial in promoting informal learning activities (Rodriguez-Gomez, Ion, Mercader, and López-Crespo 2020). This condition must be backed by school authorities and leaders. At the mercy of the organizational division of labour, some TVET teachers especially novice teachers thought they lacked opportunities to participate in collective informal learning activities, and they were spectators most of the time. After all, participatory practices are pedagogically important (Billett 2004). Moreover, teachers are often too busy with some administrative tasks and ignore arranging these activities periodically. The regional cultivation system for TVET teachers is more inclined to those backbone teachers, and it also makes novice teachers feel unsupported.

On the other hand, informal learning outcomes are difficult to measure and are often based on people's improved understanding of their daily work experience. It is because of informal learning's abstractness and contextualization that there are no compulsory assessment procedures for it (Galanis et al. 2016). Under the School's professional title systems of Chinese vocational schools, although teachers' informal actions lead to substantial improvements in teaching behaviours or remodelling of educational beliefs, they are helpless to teachers' promotion. To some extent, this will discourage teachers from participating in informal learning activities. Donitsa-Schmidt and Zuzovsky (2020) confirmed that informal learning is an influential factor in determining promotion along teachers' career paths but to a lesser degree.

5.4 Limitations and suggestions for the further research

Although we try our best to provide an overall reflection on Chinese TVET teachers' informal learning through this study, the findings may fail to represent the entire Chinese TVET situation, due to the limited number of participants who were willing to take part in an interview. The interviewed TVET teachers were mostly at the beginning of their careers, thus the findings may not fully represent the informal learning of experienced teachers. In Addition, although three aspects of influencing factors are proposed, how these factors affect TVET teachers' informal learning has not reached a definite conclusion. In future research, quantitative research might be conducted to explore the influencing mechanism of each factor and compare the differences among different teacher groups in these influencing factors. At the same time, the samples might be expanded to find out the difference among TVET teachers' informal learning from different categories of speciality.

5.5 Implication

Informal learning is a powerful supplement to TPD in addition to formal training programs. Even with the continuous emergence of advanced technology and learning methods, TVET teachers still need vocational schools to provide them with a good informal learning space. Therefore, school leaders and policymakers need to improve the institutional arrangements for the development of TVET teachers and provide organizational support for TVET teachers' informal learning. For example, vocational schools should encourage teachers to conduct interdisciplinary communication, and strengthen the recognition of informal learning outcomes. Besides, the administrators of vocational schools should strive to reduce the burden of administrative affairs of TVET and ensure the time for teachers' independent learning activities. During collective informal learning activities, the organizers should attach importance to the group culture such as equality, openness, inclusiveness, and autonomy. They also need to take effective measures to promote rational discussion and critical reflection.

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