The current state of the TVET teachers’ workplace learning in China

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Abstract. Workplace learning emphasizes a learning paradigm that considers learners to be active and self-directed rather than passive learning in the traditional training paradigm. The aim of this article is to try to synthesize the existing literature and studies as well as summarize the relevant information and available evidence to find the current state of teachers’ Workplace Learning in TVET (Technical and Vocational Education and Training) institute. In practice, this study will help vocational schools understand the current situation of vocational education teachers’ workplace learning and provide evidence for vocational colleges to take reformation and transformation. For the future, researchers could explore the relationships among workplace learning environment, learning strategies, and learning outcomes in the TVET context.

1. Introduction
Workplace learning as the way people learn to develop their work skills in the workplace, which involves the following aspects of job competence [1]. Puts it - task or technical skills, skills of task management, skills of contingency management, and skills of role and environment [2]. According to UNESCO, technical and vocational education is “a comprehensive term referring to those aspects of educational process involving, in addition to general education, the study of technologies and related sciences, and the acquisition of practical skills, attitudes, understanding, and knowledge relating to occupations in various sectors of economic and social life” [3]. Specifically, technical and vocational education is planned to directly develop expertise in techniques about relevant technology and skill, provides practical experience in people’s real work environment, offer the opportunity of getting skill-based training, and gaining valuable hands-on skills which can be applied in a particular occupational field [3], [4].

On February 19th, 2019, Chinese Ministry of Education held a conference on the issue of vocational education reform. At the meeting, the Department of Vocational Education introduced that in 2018, there were 11,700 vocational colleges in China, with a total of 26,855 million students. The Department of Vocational Education also mentioned that every year, vocational education delivers tens of thousands of skilled and high-quality workers (such as mechanics, plumbers, technicians, craftsmen, and electricians) to society. The Technical and Vocational Education and Training (TVET)
plays a crucial role in cultivating technical personnel on a large scale and providing indispensable human resources support for the country's economic and social development.

To resolve the employment problem of students, some vocational schools set up their own enterprises or factories and produce products by themselves [5]. This is not only convenient for students but helps vocational teachers to have more control over the training process. Meanwhile, this also puts forward higher demands to the vocational teachers - they must have rich and flexible practical knowledge of the subjects they teach and need to possess skills for practical operation such as how to operate or control electronic equipment expertly. However, in reality, the majority of vocational education teachers of China are from academic universities because many of the graduates from vocational colleges go directly to companies. These newly recruited teachers possess theoretical knowledge, but actually most of them have no practical experience and operating skills such as how to operate electronic equipment or how to control the cutting off machine [6]. That is why Tao [7] reports that in recent years, with the education reform, vocational education is facing new challenge of lacking “double-qualified teachers” which requires that vocational school teachers are not only masters of theoretical knowledge but also guides of practical skills in actual production.

For vocational teachers, to become “double-qualified teachers”, and make work more efficient can only be realized through learning as nowadays with the rapid development of economy, science, and technology, the only constant is change; everyone knows that whatever their cultural background, personal history, professional role, mental structures or experiences, they have to learn to boost their knowledge, skills, and abilities to keep up and ensure themselves are well-positioned to deal with new changes, challenges, and opportunities [8]. According to the 70:20:10 learning model [9], formal training represents only 10 percent of the ways a person learns, and the more significant learning comes from challenging experiences like doing tasks and exercises (70 percent), and relationships like talking to and interacting with their colleagues or other people (20 percent) [9,10].

Therefore, given the paucity of related research literature and the importance of both workplace learning and vocational teachers to application-oriented talents [7], it is necessary and worth to examining their current workplace learning.

2. Workplace Learning and its Types: Formal, Informal, and Non-formal Learning

“Workplace learning” is a terminology embracing/possessing a broad-ranging interpretation. As noted by Evans and Kersh [11], there is neither a singular connotation/concept nor a unified approach to define, specify, and synthesize the sense of workplace learning including what workplace learning is, what key elements it should comprise and how are these element related to each other as the perspectives and perceptions vary between different studies.

Mezirow [12] describes workplace learning through the lens of three domains of learning: instrumental (center on skill development and increasing productivity), dialogic (related to learners’ organization and their position in them), and self-reflective (the way individuals assess themselves and how they respond to the need for self-change in the workplace) (as quoted in Smith [2]). These three forms of learning bring together “when people become critically reflective by acquiring an understanding of why things are being done in a particular way” [2].

Commonly, workplace learning includes informal learning [13,14], formal learning [15], and non-formal Learning [16]. Meanwhile, Eraut applies dichotomy and classifies learning into formal and non-formal learning [17]. He prefers to use “non-formal learning” as a residual category to embrace any types of learning which occur outside of non-formal learning, rather than employ "informal learning". The most obvious reason for him to do this is: he believes that the term ‘informal’ describes a series of colloquial terms that perhaps is not great associate with learning, such as informal wear, informal language, informal behavior, etc., thus, in this context, it seems more appropriate to use "non-formal" as the contrast to "formal" [18]. However, considered through the lens of trichotomy, the EC (European Commission) proposes a compromise classification that put "non-formal learning" between formal learning and informal learning to reduce that gap between the two. Non-formal learning works as a bridge connecting components of both informal and formal learning [16], as it may be planned
with a facilitator or a mentor in charge, but it is not organized by academic institutions or formal setting.

The EC uses the following four principles (a. learning places and sources; b. whether it involves a certificate or credit; c. whether it is structured or not; and d. whether the learner is intentional or not) to make a distinction of the following three kinds of learning:

- Formal learning: intentional, arranged by educational institutions or other formal programs; structured concerning learning goals, learning place, and learning time; leading to a diploma or a degree.
- Non-formal learning: learners are intentional; may not be arranged by an institution, but is usually structured in some way, even if it does not result in the recognized credential.
- Informal learning: rather than being organized by a formal curriculum, it is never structured; no credits earned and no qualifications granted; learners' learning may be conscious, but in most cases, is unconscious, accidental, random, experiential, and spontaneous [19].

Despite the fact that non-formal learning is poor efficiency (in comparison with formal education) as it is not influenced by curriculum but revolve around/contingent on experience, it involves the experiential learning activities that offer opportunities for learners to explore their intrinsic or emerging interests and fostering the development of individual’s competencies and capacities, such as interpersonal and decision-making skills [18]. Individual’s interest, as the driving force behind this process, stimulate his or her willingness and motivation to participate, which explains why non-formal learning is frequently perceived to be more engaging.

3. The importance and effectiveness of Workplace Learning in TVET

Workplace learning is conducive to raise employees' job satisfaction. For example, Robert W. Rowden [20] conducted an empirical study to examine the relationship between workplace learning and employee satisfaction in small and medium enterprises (SMEs) of the US. The finding shows that there is a positive statistically significant correlation between workplace learning (three types: formal, informal, and incidental) and the worker’s sense of job satisfaction. Specifically, in their study, informal learning accounts for 19 percent of the overall job satisfaction variance, incidental learning accounts for another 19 percent, and formal learning accounts for 9 percent. This indicates that a large part of the employee’s sense of job satisfaction from workplace learning can be attributed to informal and incidental learning. Informal learning is helpful for employees to renew knowledge, keep skills up-to-date, stay abreast of technological advances and to become more conversant with organizational strategy when skill demands change rapidly due to the enhancement of the technological level in today's fast-growing society [21]. Informal learning at work also has a profound impact on employee performance. For instance, De Grip [21] points out that informal learning offers opportunities for new hires to learn more not only from consulting with supervisors or collaborating with colleagues in the workplace but also through tackling a variety of challenging tasks and roles or achieving productive work (learning by doing), which has been shown to steeply increase newly hired workers’ performance in their first or two years employment. Actually, not only newly hired works who can benefit from the informal learning process. Much evidence shows that people who involved in this kind of learning can learn more from peers and through finding solutions which are available and practical for solving their day-to-day problems in relation to the workplace [22–24].

4. Methods

Taking other reviews of research literature [25,26] as a guide, determining the inclusion criteria is critical for conducting this synthesis review. First of all, articles published between 2009 and 2019 were searched in three predominant database systems of China: CNKI, VIP, and WANFANG DATA. Furthermore, The following terms or keywords were used to conduct the search: ‘China’, ‘TVET’, ‘Vocational Education’, and ‘Workplace Learning’. Titles, abstracts, background, and conclusion were retrieved, and articles were screened to be included if they were related to the proposed issues concerning the workplace learning which takes place in Chinese TVET institutions.
A total of 26 publications, which met the aforementioned criteria, were yielded in our preliminary list through this electronic search. Moreover, this review only focused on workplace learning on the part of teachers in secondary vocational schools and higher vocational colleges.

Thus, the title, abstracts, and scope of the articles, which were relevant to teachers themselves, or the teaching process in TVET were examined. To this point, the search resulted in 11 publications. Furthermore, the "snowball method" was used to review the references of these chosen publications for additional works. One new article emerged after finalizing this method. Finally, there were 12 papers included in this review.

5. Result and Discussion
The main findings contributing to the current state of VET teachers’ workplace learning include:

5.1. Workplace learning fostering teachers’ professional development
Workplace learning has become increasingly popular in China due to the fact that it provides opportunities for combining planned and unplanned learning, informal, non-formal, and formal learning [27], individual and teamwork; promoting the interaction between novices and experts, and transferring workplace skills, craft, and work-related regulations or habits to newcomers [28–32]. Workplace learning demonstrate that it can foster teachers’ professional development and maintain their effectiveness; and this is mostly triggered by frequently collecting additional skills [27,28,33], picking up new techniques [29], honing existing skills, seeking and integrating new knowledge [33], expanding existing experience in informal settings or in the challenge of the work itself [31,34]. Furthermore, workplace learning tends to focus on locating learning with social relations that perhaps has more potential to contribute to lifelong learning [31] and social engagement [29,33], gives full play to the identity of teachers as the subject of learning, and promote teachers to learn selectively according to their own needs and the actual situation [33], which are crucial for TVET teachers’ professional growth.

5.2. Workplace learning strategies
Learning strategies were defined as "behaviors and thoughts that a learner engages in during learning" which are "intended to influence the learner's encoding process" [35]. Clearly, learning strategies, as ways that people gain new knowledge and acquire skills, are embedded in all kinds of learning, regardless of learning context and content. Through the literature review, we identify 4 main workplace learning strategies: learning by doing/through experience, learning through reflection, collaboration with colleagues, and 'trial and error' [29,33,34]. Among them, collaboration with colleagues is mentioned many times by different scholars: collaboration can occur when teachers talk often about their professional work. Through reflective dialogue, teachers engage in conversations aimed at discussing assumptions about teaching and student learning. This reflective dialogue can promote teacher learning and it is also positively related to student achievement. The more teachers collaborate, the more they are able to converse knowledgeable about theories, methods, and processes of teaching and learning, and thus improve their instruction [29,30].

5.3. The challenges of TVET teachers’ workplace learning
Through the literature review, we identified the following learning barriers that hinder TVET teachers’ workplace learning. In the literature on the school as a context for teacher learning, we identified three main inhibitors for teachers’ learning environment: the absence of specific physical and institutional environment support, ignoring the autonomy of teachers’ learning, and lack of teacher collaboration [29,30,33].

TVET institutes pay attention to students’ learning environment (including the laboratory, the study room, and the training base, etc.), while lacking the support of specific physical and institutional environment for teachers learning. Several TVET institutes do not provide enough support to make a major influence on the school culture and provide targeted information for teachers’ learning in the
workplace [30]. For example, teacher training, to some points, is carried out “passively” because training programs are mostly based on directive training targets and measures, which inhibit the teachers' own professional development needs and ignore the autonomy of teachers' learning [33]. Shou [30] and Zhang [31] report that a lack of time, as another inhibitor, constraints teachers’ workplace learning because most of the teachers are bound to teaching and it is difficult to have independent time and space to learn. In the aspect of work interaction, the TVET institutes do not cultivate a learning culture of “learning community as a learning environment” for teachers or provide teachers with enough opportunities to discuss and cooperate, which can improve the practicality and effectiveness of community learning [30]. This finding is consistent with the empirical research work of Lin [36] in which individual teacher has a strong motivation for learning, while the driving force of TVET institutes for teachers’ organizational learning is significantly insufficient and weak. In addition to the above-mentioned inhibitors for teachers’ learning environment, whether teachers have high levels of job satisfaction, according to the latest study (Zhu [37]) is the key factor that positively or negatively affects vocational teachers’ workplace learning input. Professional teachers have different feelings and experiences on different factors such as self-awareness, working conditions, and interpersonal interactions in the workplace. These emotional factors affect the enthusiasm that they invest in workplace learning [38].

6. Conclusion
With the rapidly changing world, education is evolving, and consequently, the challenges are also evolving. Therefore lifelong learning is necessary for teachers to continue to learn in their daily professional lives to renew knowledge, extend practical/experiential skills, and to stay abreast of technological advances [8]. In response to the above-mentioned challenges, TVET institutes should provide specific support for teachers’ physical and institutional learning environment, give more the autonomy of teachers' learning, and offer more opportunities for teacher collaboration learning in the workplace.

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