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Understanding vocational teachers' professional development in work placement: learning goals, activities, and outcomes

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ABSTRACT

This study provides an insight into the professional development of vocational teachers within the context of work placement, a continuing professional development programme situated in the industry. Learning goals, activities, and outcomes have been described based on vocational teachers' learning experiences in this programme. We conducted interviews with 27 secondary vocational teachers from China and 5 of these participants completed digital logs. Seven categories of learning activities were identified, of which learning from others with and without interaction were the most common categories, while mentoring was more frequently perceived as an important category than others. Moreover, there were 8 types of learning goals and 12 types of learning outcomes reported. The participants preferred teaching and working knowledge and skills as their learning goals more than beliefs and attitudes with respect to learning from work placement. Intentions for teachers' practice were concentrated on the school, collegial, and classroom practice levels. Regarding the perceived relationship between learning activities and outcomes, mentoring and learning from others with interaction were connected with all or almost all learning outcomes. The occupational knowledge and skills were frequently generated from all identified activities except reflecting. Limitations and theoretical and practical implications are discussed.

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work placement; vocational teachers; professional development

Introduction

'I'm really afraid that my students can't be qualified for a job. The knowledge from textbooks is possibly not enough. I need to know what is happening in the industry and bring it to my class' (Barbara, one of the teachers in this research).

How to promote vocational students' successful transition from school to work has always been an intriguing and important topic in the field of vocational education (Akkerman and Bakker 2012; Esmond 2021). To be able to prepare vocational students

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for the role of competent practitioners, vocational teachers are supposed to keep their occupational knowledge and skills up to date and relate this to their school practice (Andersson and Köpsén 2018; Tyler and Dymock 2019). This is particularly important for vocational teachers from school-based vocational education systems (Andersson and Köpsén 2018). To support vocational teachers in this task in several countries, various learning activities and programmes have been employed. For example, in Australia, a series of activities are advocated by the government, such as working part-time in industry, belonging to industry associations, and undertaking accredited training relevant to the industry area (Australian Skills Quality Authority 2017).

An example of such a programme for vocational teachers situated in the industry world is ‘work placement’, a continuing professional development programme where vocational teachers can deepen their understanding of the industry through authentic experience. The literature indicates that work placement has been the most prevalent programme for vocational students to develop their occupational competence, and therefore it is also considered valuable for vocational teachers’ professional development and advocated by policymakers (Andersson and Köpsén 2015; Zaid and Champy-Remousse-nard 2015). To date, work placement has been implemented in many countries, such as England, Finland, Sweden, France, Australia, and China, using different labels, like industry release in Australia and hands-on programmes in England (Schmidt 2019; Lloyd and Payne 2012). The value of work placement for vocational teachers has been illustrated in the recent literature (Andersson and Köpsén 2015; Zaid and Champy-Remousse-nard 2015). Little is known, however, about how vocational teachers’ learning takes place and what changes occur in their mind and school practice related to the context of work. Therefore, our study aims to reveal the process of vocational teachers’ professional development during a work placement with an exploration of their learning goals, activities, and outcomes.

Work placement as a context for Chinese vocational teachers’ professional development

In China, as the context of our study, work placement has been implemented nationwide. In recent years, the concept of ‘double-qualified teachers’ was proposed by the Chinese government and developed within the Chinese vocational education system, which implies that vocational teachers are supposed to acquire both theory-based and practice-based teaching competence (The State Council of the People’s Republic of China 2005). To achieve this goal, work placement was designed and organised with the guidance of the Chinese government. Since 1997, the government has enacted several policies of first encouraging and later forcing vocational teachers to participate in work placement. The latest document was issued in 2019, which requires that all vocational teachers should undertake work placement for at least one month every year (The State Council of the People’s Republic of China 2019).

Although vocational teachers have the freedom to seek host organisations and occupations by themselves to undertake their work placement, options for work placement are also offered to them by designers from schools or municipal educational departments. The designers of work placement usually schedule tasks for the participating teachers in work placement that are similar to those of the other employees in the host organisations.

However, while being engaged in work placement, not all teachers actually work on the tasks that are organised for them. This can occur for several reasons. Firstly, because the vocational teachers that take part in work placement are not part of the regular staff within the host organisations, they are not entitled to multiple benefits and they do not have to follow the rules of the host organisations. Secondly, the tasks on the job are generally rather professional and complicated, which means that vocational teachers, especially those teachers with less occupational experience, might have difficulties in performing in the everyday work process. Thirdly, the period of work placement is usually not long, which means that vocational teachers must go back to school when they become familiar with the daily work. Fourthly, the main aim of work placement is teacher learning, which means that teachers attend other activities, such as observing others' work, rather than carrying out tasks all the time. The Chinese government also encourages vocational teachers to learn from a variety of activities during work placement (Ministry of Education of the People's Republic of China 2016). Normally, the activities in work placement are designed and arranged for vocational teachers based on the setting of the host organisations, on the one hand, and the preferences of the participating vocational teachers within those organisations with regards to what and how to learn, on the other hand.

From the previous section, it becomes clear that work placement can be seen as a continuing professional development programme for vocational teachers situated in the industry. Still, the complicated context of work placement involves that teachers' learning in this context is different from professional learning in other common contexts, such as teachers in schools or other professionals at the workplace. Consequently, when exploring vocational teachers' learning in work placement, the vocational context should be particularly taken into account. However, the current literature on vocational teachers' professional development in work placement and vocational contexts is quite limited. Therefore, in our theoretical framework, we will use the perspective of teacher professional development, with consideration of studies on learning at work by other professionals.

Teachers' professional development

Teacher learning activities

In the past two decades, a number of scholars have worked on the identification and categorisation of teacher learning activities in the school context as a work setting (Hoekstra et al. 2009; Meirink, Meijer, and Verloop 2007). Meirink, Meijer, and Verloop (2007) distinguished five categories of teacher learning activities in the school, consisting of (a) learning from doing, (b) learning from experimenting, (c) learning from reflecting, (d) learning from others with interaction, and (e) learning from others without interaction. A similar categorisation was generated by Lecat et al. (2019), while learning from doing, experimenting, and reflecting are viewed as the subcategories of learning from oneself. Studies on teacher learning activities in the school as a workplace indicate that this learning can be both formal and informal, and a body of research describes informal activities that are not structured or planned (Hoekstra et al. 2009; Lecat et al. 2019).

Given that our study is conducted in the Chinese vocational education context and that the participating teachers are learning in companies, the company workplace may

influence the forms of learning activities. For example, vocational teachers may have opportunities to receive in-company training which is provided for employees during work placement (Zhang and Fang 2016). In previous insights from studies on learning at work, common learning activities have been identified, including in-company formal training, learning through task execution, learning through reflection, learning through exploration, learning via colleagues, and mentoring (Lapointe and Vandenberghe 2017; Manuti et al. 2015; Nikolova et al. 2014). The learning activities found in studies on learning at work are quite similar to teachers' informal learning activities in school as found by Meirink, Meijer, and Verloop (2007). This is possible because the school context is also a type of workplace.

Teachers' learning goals and outcomes

In previous research, a positive association between teachers' learning goals and participation in learning activities has been found, which entails that high learning goal orientation could motivate teachers' efforts to learn (Kunst, Woerkom, and Poell 2018). Learning goals refer to teachers' aspirations regarding changes in their behaviour or cognition (Louws et al. 2018). With regard to participation in a programme, learning goals can also be regarded as teachers' expectancies of learning outcomes with respect to professional development and school practices. In this way, learning goals and outcomes can be analysed and interpreted from the same perspective.

A substantial amount of literature has explored teachers' learning outcomes from the perspective of changes in their professional development (Harper-Hill et al. 2020). Within the teacher change model initiated by Guskey (1986) the changes in teachers' beliefs and attitudes, teaching practices, and student outcomes are understood as the three major components of teacher development. However, it could be difficult to catch these three types of outcomes at the same time because often, there is a sequence in their occurrence. Harland and Kinder (2014) took into account this sequential perspective when developing their model for understanding the possible outcomes of the continuing professional development of teachers in in-service education and training (INSET). It encompasses nine types of learning outcomes, such as knowledge and skills and new awareness. In Table 1, the sequence among the different types of outcomes is summarised. In Harland and Kinder's (2014) model, the impact on practice is deemed the ultimate outcome with respect to behaviours, which can be obtained either directly or through indirect paths, in a process that is influenced by the other outcomes.

The connection between learning activities and outcomes

A large number of studies have revealed what teachers learn without depicting a clear relationship with what these teachers did. In some other studies, this relationship has been made. For example, Bakkenes, Vermunt, and Wubbels (2010) utilised chi-square

Table 1. A sequence of INSET outcomes.

INSET input			
Third order	Material and provisionary	Informational outcomes	New awareness
Second order	Motivational and attitudinal outcomes	Affective outcomes	Institutional outcomes
First order	Value congruence	Knowledge and skills	
Impact on practice			

tests to quantify the relationship between learning activities and outcomes. The results showed that learning activities reported by the teachers, such as considering one's own practice and getting ideas from others, could be associated to a significant extent with changes in teachers' knowledge and beliefs, intentions for practice, emotions, and actual practice. Moreover, Hoekstra et al. (2009) explored to what extent teacher learning activities can be connected with changes in their conceptions and behaviour and found a significant difference in frequencies of a variety of activities among four clusters of teachers created according to their initial and change scores on the questionnaire.

The present study

Previous studies have provided insights into teachers' professional development through their learning goals, activities, and outcomes. Nevertheless, most of these studies have been constructed in a school-based environment instead of other professional contexts, which enable additional learning opportunities for teachers in vocational education in particular. Although work placement has been a popular and valuable programme for in-service vocational teachers in many countries, until now, research in this area has been limited. Our study aims to contribute to a comprehensive understanding of teachers' professional development in work placement. The findings can inspire programme designers, school leaders, or policymakers in their efforts to support teachers' learning. In our study, vocational teachers' professional development in work placement is investigated from the perspective of teachers' perceived learning goals, activities, and outcomes. Three research questions direct this study:

Q1: What are vocational teachers' perceived learning activities in work placement and which activities do they perceive to be important?

Q2: What are vocational teachers' perceived learning goals and outcomes?

Q3: How do vocational teachers perceive the connection between their learning activities and outcomes?

Method

Participants

To explicitly portray vocational teachers' learning experiences in work placement, in-depth interviews were conducted in this study, for which we used a semi-structured interview guide. The participants were 27 secondary vocational teachers from Shanghai, who were selected based on the following criteria: (1) participants should attend work placement during the summer break of 2020; (2) participants should undertake work placement for at least one month; and (3) the sample is heterogeneous in age, gender, teaching experience, teaching subjects, occupational experience, and school. It was explained to the participants that participation was voluntary and that their digital logs and interview data would be kept confidential and would only be available for research purposes. The current study received ethical approval from ICLON Research Ethics Committee with the registration number IREC_ICLON 2020-06. Table 2 shows teacher participants' background information, including fictional names, teaching domain, teaching experience, and occupational experience.

Table 2. Participants' information.

Number	Fictional names	Gender	Teaching domain	Teaching experience (Years)	Occupational experience (Yes/No)
1	Alice	Female	Agriculture information	2	No
2	Barbara	Female	Accounting	24	No
3	Cara	Female	Accounting	22	No
4	Baron	Male	Internet of things technology	6	Yes, several years
5	Calvin	Male	Decoration of automobile beauty	14	No
6	Dora	Female	English for tourism	1	Yes, 3 years
7	Grace	Female	Engine inspection and maintenance	4	No
8	Dave	Male	Automobile maintenance	3	Yes, 4 years
9	Frank	Male	Painting	7	No
10	Harry	Male	Electric control	6	No
11	Jeff	Male	Welding	7	No
12	Kristin	Female	Marketing and e-commerce	3	No
13	Mark	Male	Intelligent manufacturing	13	Yes, several years
14	Maria	Female	Computer application	21	No
15	Mike	Male	Welding	1	Yes, 18 years
16	Peter	Male	Internet of things technology	3	Yes, 1 year
17	Rose	Female	Graphic design	7	No
18	Sara	Female	Package design	12	No
19	Wendy	Female	Architectural working drawing	4	Yes, 2 years
20	Steven	Male	Mould manufacturing and design	15	No
21	Tina	Female	Construction project budget	16	No
22	Tom	Male	Digital controlled lathe	18	No
23	Sandy	Female	Digital publishing	20	No
24	Penny	Female	Nursing gerontology	3	Yes, 2 years
25	Nancy	Female	Physiology	7	No
26	Mona	Female	New media	1	Yes, 1 year
27	Nydia	Female	Digital media	15	No

Data collection

Procedures

The participants were interviewed individually within one week of completing their work placement. All the interviews were conducted by the first author and online via WeChat. The average time of each interview was around 45 min. All the interviews were audio taped and transcribed verbatim with the permission of the interviewees. After the interviews, each transcript was sent back to the interviewee with a request to respond to the first author concerning whether it was accurate. All the interviewees responded positively, which means that there were no revisions or additions needed in the transcripts.

Furthermore, we received five profiles of digital logs from those teacher participants who indicated that they would like to share their logs with the first author during the interviews. Then, we organised the data based on a timeline for each participant. As shown in Table 3, each of these five participants had at least four digital logs for work placement.

Semi-structured interview

Semi-structured interviews were developed to understand vocational teachers' perceptions of their process of professional development in work placement. The interview

Table 3. The number of digital logs for the participants.

Name	Number of digital logs
Kristin	4
Mark	8
Peter	4
Tina	6
Penny	4

protocol was focussed on three themes: (1) learning activities that teachers used in work placement; (2) learning goals that teachers set for work placement; (3) learning outcomes that teachers obtained from the work placement, including their intentions for practice. Interviews started with open questions, such as ‘Could you please introduce your experience with this work placement you just completed?’. Following the open starting questions of each interview, teachers were asked to report on their learning activities, goals, and outcomes. A checklist with follow-up questions was applied with a list of possible constructs.

Digital logs

Although we did not request vocational teachers to write down their learning experiences during their work placement, several vocational teachers were required by their school leaders or programme providers to write logs recording their work placement experience weekly. All these logs had a similar structure, which aimed to answer three main questions related to the period of work placement, including ‘What did you do during this week’, ‘What do you get from this week?’, and ‘What are your feelings about this week?’. Although the writing logs were not included as data sources in the research design, we did use them in our analyses to examine the validity of the findings from the interviews (see the section on coding and analysis), which means that the digital logs were not used in the findings.

Development of schemes

We analysed the raw data with the guidance of the coding schemes generated from previous literature. The categories of learning activities are derived from Meirink, Meijer, and Verloop (2007). To adapt the context for our study, two categories from professionals’ workplace learning were supplemented. Mentoring and formal training were added from Lapointe and Vandenberghe (2017) and Manuti et al. (2015). Therefore, a seven-category scheme of vocational teachers’ learning activities has been constructed (see Table 4). Regarding learning goals and outcomes, a coding scheme was developed based on the model of Harland and Kinder (2014). To elaborate on teachers’ knowledge changes, the category of knowledge and skills was split into occupational knowledge and skills and new ideas for teaching, which address teachers’ occupational and pedagogical aspects, respectively. Impact on practice in the original model refers to teachers’ intentional changes in their school practice, and it is described with teachers’ intentions for school practice for the next semester after participation in work placement in our study. To make vocational teachers’ changes in practice more clear, the impact on practice was excluded from the scheme and explored independently.

Table 4. The categories in coding schemes.

Learning activities	Learning goals and outcomes
Doing tasks	Material and provisionary outcomes
Experimenting	Informational outcomes
Formal training	Occupational knowledge and skills
Learning from others with interaction	New ideas for teaching
Learning from others without interaction	New awareness
Mentoring	Affective outcomes
Reflecting	Motivational and attitudinal outcomes
	Institutional outcomes
	Value congruence outcomes

Coding procedures and analysis

To answer the research questions, the coding and analysis of the 27 interviews were carried out. The authors chose the fragments in which teachers reported their learning goals, activities, outcomes, and the relationship between activities and outcomes as coding and analysis units. A fragment usually represents one coherent and continuous view, no matter the length or number of sentences. Additionally, to check the inter-rater reliabilities, an independent researcher coded six transcripts independently by using the final categories for learning goals, activities, and outcomes. The Cohen's kappa statistic was used to measure the agreement on the ratings of two independent coders. The benchmarks were as following: ≤ 0 = poor, 0.01–0.20 = slight, 0.21–0.40 = fair, 0.41–0.60 = moderate, 0.61–0.80 = substantial, and 0.81–1 = almost perfect (Landis and Koch 1977). Based on the inter-rater reliabilities, no adaptations were needed for the categories.

Specifically, to generate the categories of teacher learning activities in work placement, the relevant fragments were firstly identified and then placed into the existing categories from the scheme in terms of their meanings. All fragments could be included within the scheme, which means that teachers' learning activities in work placement could be grouped into seven categories in line with the scheme (with Cohen's kappa 0.85).

The same procedure was conducted in coding and analysing teachers' learning goals and outcomes except intentions for practice. Yet, for learning outcomes, aside from the nine codes of categories from the scheme applied in the transcripts, six new codes were produced and then adjusted as three new categories, which were named as finding a gap, personal life, and research ability. Moreover, three categories were redefined with the content of the fragments. The Cohen's kappa for the final categories of learning outcomes was 0.78.

Concerning learning goals, three categories (motivational and attitudinal outcomes, new awareness, and value congruence) from the scheme could not be connected to any fragment, while two categories (finding a gap and research ability) were added to the scheme (with a Cohen's kappa of 0.87).

Considering intentions for practice, the transcripts were coded and analysed with the following three steps: Firstly, the fragments related to teachers' planned changes in their school practice were realised and labelled. Next, the labels were merged into categories based on the main issues that teachers would like to perform. There were six categories generated (with Cohen's kappa 0.89). Then, these categories were formed into levels with regard to their perspectives. Three levels, including the school, collegial, and classroom practice were identified finally.

Based on the identified learning activities and outcomes, the perceived relationship between the activities and outcomes was coded. An example of the reports was, ‘I talked with some new employees who had just graduated from school to get the points of competence requirement for entry’, which was coded as ‘learning from others with interaction related to occupational information’. As teachers seldom talked about what types of activities led to their intentional changes in practice, this study would like to ignore the intentions for practice and focus on other outcomes when exploring the relationship between learning activities and outcomes.

For a check on the validity of the findings from the semi-structured interviews, the digital logs were also coded by using the final coding schemes. Also, the codes from digital logs were compared with the interview codes to check for consistencies between these two types of data. The results showed that all fragments in the logs could be coded with the categories in the revised scheme and for each of these five participants, the codes for their digital logs were also observed in their interview transcripts.

To answer the first and second research questions, the categories relevant to the teacher participants’ learning goals, activities, and outcomes are described, and the number of participants who mentioned these categories were counted to identify the most common categories. To answer the third research question, a cross table was applied to analyse the participants’ perceived relationship between learning activities and outcomes.

Results

Learning activities

To obtain information about vocational teachers’ learning activities in work placement, teachers were asked to report the specific activities that they attended during their most recent experience. In [Table 5](#), the descriptive results are presented. Seven categories were identified separately: (1) ‘doing tasks’ refers to vocational teachers’ engagement in

Table 5. The categories and specific activities with the number of participants reported ($n = 27$).

Activity category	Number of participants (Attending)	Number of participants (Important)	Specific activity	Number of participants (Attending)	Number of participants (Important)
Doing tasks				19	10
Experimenting				16	8
Mentoring				16	14
Reflecting				15	4
Learning from others with interaction	25	12	Colleague	16	9
			Manager	6	1
			Teacher	11	1
			participants		
			Meeting/ discussion	8	0
Learning from others without interaction	24	7	Observation	20	7
			Reading	13	1
			Searching online	5	0
Formal training	19	11	Lecture	14	5
			Practical training	6	5
			Visiting	12	2

routine work; (2) ‘experimenting’ means teachers make trials in their practice; (3) ‘mentoring’ describes assigned mentors’ guidance for teachers’ practice or learning; (4) ‘reflecting’ describes teachers’ thinking with purpose, which is related to their practice in host organisations or schools; (5) ‘learning from others with interaction’ underlines teachers’ communication with different individuals during work placement as teachers might learn from colleagues, managers, and other teacher participants who attend work placement with them through direct dialogues; (6) ‘learning from others without interaction’ implies that teachers learn from various objects or through self-exploration. Reading materials, observation, and searching for information online are all included; and (7) ‘formal training’ refers to activities arranged by host organisations and obtained via an elaborate design, such as lectures, organised visiting inside or outside host organisations, and practical training. A participant described her formal training experience during work placement:

I experienced a comprehensive induction training with other new employees. It started from acquainting the company culture, then focused on improving work-related skills. It’s an opportunity for me to become familiar with this occupation. This training took me around one week in total. (Cara, 21 August 2020)

For activity categories, the results in [Table 5](#) show that most teacher participants used combinations of various activities during work placement. Learning from others with and without interaction were the most frequently reported categories and mentoring was most frequently perceived as an important category, following by learning from others with interaction and formal training.

Learning goals and outcomes

Based on the analysis, 12 categories of learning outcomes were identified, and 8 categories of them were reported as learning goals. The descriptions for each category are displayed in [Table 6](#). Six categories were in line with the coding scheme in terms of the descriptions, including affective outcomes, motivational and attitudinal outcomes, new awareness, new ideas for teaching, occupational knowledge and skills, and value congruence. Three categories from the scheme generated by Harland and Kinder (2014) were redefined based on the interviews. The first one is materials and provisionary outcomes. As most materials can be captured as teaching cases in our study, combining materials and cases appeared to be a good way to reconstruct this type of outcome. The second category that has been adapted is institutional outcomes, which not only relates to school or collegial development but also contributes to host organisations, such as relieving employees’ workload. The third category is informational outcomes, which were originally described as the information linked to teachers’ courses. In our study, the informational outcomes that teachers obtain from work placement are concentrated on occupational information, which refers to information about work culture, work environment, salaries and benefits, career development, and staff regulations that are relevant to vocational students’ career identity. This category as a type of learning outcome is further illustrated in the following quotation:

During work placement, I talked a lot with several employees. For example, I asked them how did they get the qualification of technician, how many years did they work before

Table 6. The categories of goals and outcomes with the number of participants reported ($n = 27$).

Categories	Descriptions	Goal	Outcome
Affective outcome	Emotional changes during work placement.	1	23
Finding a gap	Experiencing a gap between vocational education and work.	4	18
Institutional outcome	Outcomes on the level of schools, teacher groups, and work organisations.		11
Materials and cases	Physical resources or cases that teachers get from work placement.	3	17
Motivational and attitudinal outcomes	Teachers' motivation to apply the ideas obtained from work placement.	0	9
New awareness	Teachers' perceptual or conceptual shifts in thinking.	0	16
New ideas for teaching	Teachers' deeper understanding or concrete ideas related to teaching.	12	19
Occupational information	Occupational information related to students' career choice and development.	5	26
Personal life	The benefits for teachers' personal life instead of teaching practice.	0	6
Occupational knowledge and skills	The improvement of teachers' knowledge and skills of work.	23	27
Research ability	The development of teachers' research competence.	4	5
Value congruence	Teachers' personalised perspectives which are in line with work placement designers' views of 'good practice'.	0	15

getting this qualification, and whether some qualifications were only accepted by certain companies instead of the whole industry. Then, I could tell my students all of these. (Grace, 27 August 2020)

In addition to the revision of three categories of learning outcomes, three new categories were developed: (1) finding a gap, involving that vocational teachers discover the gap between vocational education and work, which could inspire them to explore how to fix it in their future school practice; (2) personal life, referring to the benefits for teachers' socialising, interests, and some other personal aspects, which are separated from their roles as teachers; and (3) research ability, which concerns teachers' research and project knowledge or experience that could be reinforced through involvement in the work context. One participant stated how his research ability was developed during work placement:

At that time, I was doing a research project relevant to a particular technology. Therefore, during work placement, I focused on the related knowledge through discussing with mentors, intentionally collecting materials while doing tasks. I think it's quite effective. (Mark, 3 August 2020)

In comparing the types of learning goals and outcomes, it is clear that the participants reported learning goals for work placement related to acquiring knowledge and skills, whereas their learning outcomes were much more diverse. Furthermore, as shown in Table 6, occupational knowledge and skills were most frequently reported by the participants as learning goals, following by new ideas for teaching, while occupational knowledge and skills and occupational information were the most common outcomes for them.

To understand vocational teachers' possible changes in their school practices, the participants were invited to talk about their intentions for practice in the next semester. These intentions for school practice refer to the category of impact on practice of the original model of Harland and Kinder (2014). The results in Table 7 show the teachers' intentions with respect to three levels: school, collegial, and classroom practice. Within the school level, the results included developing new curricula or educational standards and maintaining school-company cooperation, both of which were beneficial for the

school education in general. The collegial level emphasised teachers' sharing and collaboration with their colleagues to improve the collective teaching performance or professional development based on their work placement experience. The intentions within the classroom practice level were focused on teachers' planning changes for their teaching practice after participation in work placement. Four categories were specified from the interviews, including adapting teaching content, enriching teaching resources, providing career guidance, and organising competence-based activities or settings. For example, a participant talked about how she planned to adapt teaching content based on her work placement experience:

I seldom noticed the details when working on web design in my previous teaching practice. For instance, how to choose a typeface. I didn't know that before and I used to pick one at random. However, I got some standards for selecting a typeface during work placement. I would like to explain them to my students. (Maria, 31 August 2020)

The relationship between learning activities and outcomes

As shown in Table 8, in general, all learning activity categories were related to many learning outcomes, with mentoring and learning from others with interaction as the categories connected to all or almost all learning outcomes. Vocational teachers' occupational knowledge and skills were obtained most frequently from all learning activity categories except reflecting. For example, Alice mentioned, 'If I want to know this equipment, my colleagues would tell me what's the function of it, how does it work, and how to operate it'. The quotation indicates that this participant acquired significant occupational knowledge and skills, particularly from communication with colleague employees during work placement. It is worth mentioning that not all perceived learning outcomes displayed in Table 6 were related to the specific categories of learning activities because some outcomes were generated from attending the whole programme instead of

Table 7. The categories and specification of intentions for practice with the number of participants reported ($n = 27$).

Level	Category	Specification	Number of participants
School	Improving school education	-Developing new curricula or educational standards. -Prompting school-company cooperation.	6
Collegial	Collaborating with colleagues	-Sharing work placement experience with colleagues. -Helping colleagues to improve teaching practice.	7
Classroom practice	Adapting teaching content	-Importing newly acquired content from work placement. -Restructuring the current teaching content.	17
	Enriching teaching resources	-Introducing cases acquired from work placement. -Adding materials obtained from work placement, such as videos, pictures, and manuals.	16
	Providing career guidance	-Introducing occupational information to students. -Offering students career advice.	16
	Organising competence-based activities or settings	-Adjusting the time of theoretical and practical sections of courses to develop students' practical skills. -Organising other activities, such as teamwork, to develop students' other work-related competence.	12

specific activities. For example, participant Calvin said, ‘Through work placement, I found a gap between what our students learned from school and what they were supposed to perform in the real company workplace’. However, he did not mention which specific activity or context made him find this gap. Therefore, each value related to the connection between a certain learning activity category and outcome in Table 8 was less than the total number of participants mentioning this learning activity or outcome.

Discussion and conclusion

Our study provides a comprehensive understanding of vocational teachers’ learning experiences in work placement. Learning goals, activities, and outcomes related to work placement were explored with semi-structured interviews. The connection between learning activities and outcomes was also revealed.

Learning activities in work placement

Our study identified seven learning activity categories of which teacher participants mostly employed combinations during work placement. Learning from others with and without interaction were the most frequent activity categories in which the participants engaged. These results illustrate that vocational teachers in the industry are always faced with rich formal and informal learning sources. In the review of Tynjälä (2008), learning in the workplace was divided into three modes: (1) incidental and informal learning, such as doing work; (2) intentional but informal learning, such as mentoring; and (3) formal training. These modes are entirely congruent with the results of the categories in our study but are less specific. Compared to the framework of teachers’ learning activities in school workplace proposed by Meirink, Meijer, and Verloop (2007), the categories of informal learning activities in work placement were almost the same, which means that teachers, no matter in a school or work context, would like to use similar ways to learn. Moreover, mentoring, formal training, and learning from others with interaction were more commonly conceived as important categories of activities by the participants than others. All these three categories are linked to host organisations or stakeholders. It could be suggested that as beginners in the work context, teachers attach particular importance to the structured or non-structured support of others in host organisations.

Learning goals and outcomes toward work placement

Our study generated 8 types of learning goals and 12 types of learning outcomes. Compared to the model of Harland and Kinder (2014), several categories in our study were developed or adapted to the context of work placement or the roles of vocational teachers, such as occupational information. The results of the categories of learning goals show that teachers prefer setting the knowledge and skills instead of beliefs and attitudes as their learning goals in work placement, which is consistent with the findings of teacher educators’ self-initiated learning from Koster et al. (2008). In contrast to pedagogical knowledge and skills, teachers in our study selected occupational knowledge and skills

Table 8. The number of participants who perceived the connection between the learning activities and outcomes ($n = 27$).

	Doing tasks	Experimenting	Mentoring	Reflecting	Learning from others with interaction	Learning from others without interaction	Formal training	Participants for each type of outcome
Affective outcome	2	0	3	0	4	3	3	23
Finding a gap	1	0	4	0	3	4	1	18
Institutional outcome	3	0	0	3	1	0	1	11
Materials and cases	0	0	4	0	2	4	7	17
Motivations and attitudes	0	0	1	0	1	0	1	9
New awareness	2	0	4	1	2	3	0	16
New ideas for teaching	0	2	3	10	5	3	7	19
Occupational information	2	0	5	0	12	14	10	26
Personal life	0	0	0	0	1	0	0	6
Occupational knowledge and skills	13	13	15	4	20	16	13	27
Research ability	1	1	2	0	1	0	1	5
Value congruence	1	0	2	2	3	0	0	15
Participants for each activity category	19	16	16	15	25	24	19	

as their goals more frequently. Previous studies have found that teachers' learning goals could be connected to their current professional concerns and learning conditions (Louws et al. 2017; Louws et al. 2018). This can be used to explain our results: work placement is perceived by vocational teachers as a setting to prompt their occupational competence, and, in addition, vocational teachers appear to be more concerned with their occupational knowledge and skills than their pedagogies for teaching. The latter can be connected with the findings from Schmidt (2019) in Australia, who found that industry currency was emphasised over pedagogical skills development. He explained that this was caused by the interpretation of the policies. Similarly, in China, a series of policies have been published to promote vocational teachers' occupational expertise in the past years, which may also increase teachers' awareness of its importance.

In contrast with the learning goals, the teacher participants' learning outcomes were more diverse. All types of knowledge and beliefs were perceived by the participants. Moreover, the findings from this study show that, according to the participating teachers, learning from work placement led to teachers' intentions to adapt classroom practice, make suggestions for colleagues, as well as develop school-company cooperation. This is an exploration of the components of impact on practice which is considered as the ultimate outcome in the model of Harland and Kinder (2014), and the classification can be supported by the model initiated by Clarke and Hollingsworth (2002), which acknowledges that the domain of practice for teacher professional growth is conceived as encompassing all forms of professional experimentation, rather than just classroom experimentation. In addition, occupational knowledge and skills and occupational information were reported as the most frequent types of outcomes, which were also considered as the main goals of the policymakers in China (Ministry of Education of the People's Republic of China 2016).

The relationship between learning activities and outcomes

In previous studies, a quantitative approach has been used to examine the relationship between teachers' learning activities and outcomes (Bakkenes, Vermunt, and Wubbels 2010; Hoekstra et al. 2009). Yet, no research has been carried out in a way concerning teachers' perceptions of the possible linkage. The findings of this study show that all the types of learning outcomes, except the ones concerning personal life, could be acquired from combinations of different activities. Additionally, mentoring and learning from others with interaction in the workplace were seen as the main learning activities that led to various learning outcomes and might be considered valuable activities that were almost consistent with teachers' perception of important activities. The learning sources of knowledge and skills were more frequently reported, while the linkage between beliefs and attitudes (such as motivational and attitudinal outcomes) and learning activities were seldom mentioned by the participants. A possible explanation could be that the outcomes of beliefs and attitudes are hard for teachers to perceive as the benefits from the specific activities.

Limitations and directions for future research

There are three limitations to our study which need to be addressed. Firstly, in our study, interviews with teachers to explore their perceived learning goals, activities, and

outcomes in work placement were conducted only once. Future research could include observations or periodic interviews during the work placement to gain more comprehensive insights into teachers' professional development in this programme. Secondly, intentions for practice were employed to describe the school practice in our study, while the actual changes in school practice were still unclear. Therefore, future research could explore what real changes occur in vocational teachers' school practice after participation in work placement and what student achievements can be observed. Thirdly, we did not reveal the difference in learning goals, activities, and outcomes among teachers with different teaching and occupational experiences and teaching domains because of the limited number of participants. Future studies could explore these differences in a larger sample.

Implications

The present study leads to some theoretical and practical implications. For the theoretical implication, to begin with, we explore teachers' professional development in work placement, a context that differs from the school workplace. The results on learning activities, goals, and outcomes in work placement enrich the existing insights on workplace learning and may inspire future researchers to explore vocational teachers' learning in different contexts further. In addition, the model of Harland and Kinder (2014) was applied and found to be a useful model for the outcomes of teachers' professional development programmes. It has been adapted for learning from the work placement of teachers in vocational education. This might inspire scholars to employ and further develop this model in future research.

With respect to practical implications, the results of our study are useful for programme development in three ways. Firstly, although work placement has been applied in several countries, it is still not available in many other countries. As the acquisition of outcomes has revealed the value of work placement for vocational teachers' professional development, policymakers and school leaders in more countries are recommended to import such a programme. However, this may be influenced by the types of vocational education systems. In the workplace-based or dual vocational education system, as students can obtain work-related knowledge and skills from the workplace, teachers may be more eager to develop their pedagogies than their vocational knowledge. Since vocational teachers need to have up-to-date occupational knowledge, work placement should be firstly encouraged in countries with a school-based vocational education system. Secondly, in the present study, various learning activities and their relationship with learning outcomes during work placement were identified, and support from host organisations was reported as being important for teachers' learning during work placement. Therefore, the designers of work placement can encourage vocational teachers to work on a combination of activities and should take into account how host organisations can provide support to vocational teachers. For the latter, to facilitate the engagement of host organisations during work placement, some financial support could be considered by the government. Thirdly, teachers' learning goals mostly included the acquisition of knowledge and skills and not adapting beliefs and attitudes. Teachers can get some guidance before participating in work placement to become aware of a larger variety of learning opportunities. For example, advisory or introductory meetings

for teachers can be set up or prior participants can be invited to share their learning experience with teachers.

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Authors' contributions

The first author designed and carried out the study, wrote the draft manuscript and is responsible for all revisions. The second and third authors provided feedback in all phases of the study and suggestions for revisions to the manuscript.

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