Boundary processes in connection with students' workplace learning: Potentials for VET teachers' continuing professional development

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Abstract

This article reports on VET teachers' engagements in boundary processes between schools and workplaces in connection with students' workplace learning, the conditions for such boundary processes, and how these activities may enable VET teachers' continuing professional development (CPD). Thirty VET teachers have been interviewed and their replies have been analysed in a theoretical framework of situated learning. The VET teachers described two main forms of boundary processes: boundary encounters and brokering by VET students. These processes support the occupational learning of VET teachers to different degrees. Teachers' access to the workplace and their engagement and involvement in work and social interactions influence the potential for learning. Structural factors in school practices determine the nature of the boundary processes experienced by VET teachers and hence, the conditions for VET teachers' CPD.

Keywords: vocational education and training, vocational teachers, continuing professional development, boundary processes, workplace learning

Introduction

Vocational education and training (VET) plays a central role in providing the labour market with skilled workers. VET is also important for the life trajectories of young people who choose vocational programmes, and for adults who enter VET to find a new occupation (Cedefop, 2009). Changes in working life also require that people participate in VET to acquire skills for their present and future working lives. Here, skilled VET teachers play a central role, embodying the skills and expertise that are taught and developed in VET programmes. This means that the continuing professional development (CPD) of VET teachers is necessary in order for them to maintain and develop expertise from their initial occupation, and to ensure that they have subject knowledge of the courses that they are required to master. This subject knowledge should have industrial currency (Andersson & Köpsén, 2015; Köpsén & Andersson, 2017). The conditions for CPD within the subject contents among VET teachers differ from those of other categories of teacher, where the subject contents can be learnt primarily by reading books and journals, attending courses, etc. Occupational competence, on the other hand, is situated in continuously developing work-life contexts, which in turn means that the relationships of VET teachers to working life and workplaces are important for the industrial currency of VET teaching, preparing vocational students for working life (e.g. Köpsén, 2014; Robson, Bailey & Larkin, 2004; Wheelahan & Moodie, 2010). However, VET teachers have left their initial occupation to work as a teacher, and this changes their relationships with working life. Thus, it may be challenging for the VET teacher to maintain the required up-to-date occupational competence. This article reports on how the responsibility of VET teachers for students' workplace learning may create the conditions required for updating their occupational competence, that is professional development as part of their everyday activities at work (Bound, 2011). Students' workplace learning is one of the activities that Broad (2016) identified as providing opportunities for VET teachers' CPD, having earlier (2015) pointed out that the weakness or absence of networks in industry is a main barrier for the professional development of VET teachers.

This study concerns Swedish upper secondary level VET teachers and their cooperation with working life in connection with their students' workplace learning periods, and how this cooperation may offer opportunities for VET teachers' CPD and learning. We have used a theoretical framework and concepts drawn from situated learning theory to investigate VET teachers' interplay with workplaces in terms of engagement in boundary processes, such as boundary crossings, encounters, interactions, and relationships, between school practices and the practices of workplaces (Lave & Wenger, 1991; Roberts, 2013; Wenger, 1998, 2000). We discuss several forms of process and analyse the potential for VET teachers' occupational learning through these processes. We describe also the

conditions experienced by VET teachers relative to boundary processes between the practices of school and workplaces, and we discuss the significance of the findings for the potential of VET teachers to increase occupational competence.

The way in which VET is organised differs between countries (Cedefop, 2017). It may be solely or mainly workplace-based, employ a dual system, or be mainly school-based. In the latter case, it is normally supplemented with periods of workplace learning (e.g. Deissinger, Aff, Fuller & Jørgensen, 2013; Dobbins & Busemeyer, 2015). These different VET models offer different ways, opportunities, and demands for cooperation between VET schools and working life, and the responsibility of the VET teacher concerning the students' workplace learning also differs between them. For example, in the German dual apprenticeship system, there is a policy-level ambition that companies and schools should collaborate. However, in practice the German companies and chambers of commerce play a dominant role and have principal responsibility for workplace learning and examinations, while vocational schools play a subordinate role (Gessler, 2017). This situation influences the conditions and need for VET teachers' CPD through school-workplace boundary processes. In an Australian study of what a 'good VET teacher' is, both students and teachers highlighted the importance of expertise and experience from industry, in addition to teaching skills (Smith & Yasukawa, 2017). The study showed that the boundary-crossing character of VET teachers' work is important for good VET teaching. Thus, even if contexts differ, the demand for teachers' competence in vocational teaching subjects is essentially the same in all systems, as is the need for links to working life, to ensure that VET teachers remain up-to-date.

Swedish vocational education in upper secondary schools is mainly school-based, with at least 15 weeks of workplace learning during a three-year vocational programme. An alternative apprenticeship pathway is available, in which at least half of the time is spent in workplace learning. There are 12 national VET programmes that cover a broad spectrum of occupations, including healthcare, childcare, building and construction, industrial technology, and vehicle maintenance. Corresponding VET courses are also taught in upper secondary level adult education, where the programmes are shorter and do not include the general courses that are compulsory in upper secondary school. VET teachers are expected to have extensive work-life experience, but there are no formal requirements for teaching skill. However, most VET teachers have a teaching degree (Swedish National Agency for Education [SNAE], 2017), which they took before they started teaching or in parallel with work as a teacher (Andersson, Köpsén, Larson & Milana, 2013; Fejes & Köpsén, 2014). It should be noted that the focus of this article is VET teachers' CPD in their initial occupation. Development concerning their professional identity as a teacher, through, for example, teacher training, is discussed in other studies (see, for example, Duch, 2016). The requirements for such development differ between countries (Misra, 2011). Furthermore,

VET schools in Sweden also employ academic teachers who teach general subjects such as Swedish, English, maths, history, etc. These teachers are not categorised as 'VET teachers' and have not been included in this study, although they do teach on VET programmes and cooperate with VET teachers in them.

VET teachers at Swedish upper secondary schools and institutions of adult education usually hold a full-time position as a teacher. The work presented here was intended to help us to understand how, in these circumstances, VET teachers avoid vocational knowledge becoming obsolete and how they retain expertise in the vocational subject in which they provide teaching and training. In other words: we were interested in discovering how they retain expertise as a carpenter, chef, nurse, CNC machinist (working with computer numeric controlled machines), etc., when they have left such occupations to work as teachers.

Another characteristic of Swedish VET is that VET teachers have a formal responsibility for the vocational courses in their entirety, including certain aspects of workplace learning, even if supervisors at the workplaces are responsible for the students' daily workplace learning. This means that managing and following up students' workplace learning is an important task for VET teachers. The tasks involved include finding suitable workplaces, introducing supervisors, following up students' learning, and assessing the learning outcomes (Alvunger, 2016; SNAE, 2016). The present study investigated in particular the form taken by the interplay between VET teachers and workplaces, concerning students' placements and apprenticeships at the workplaces, and how this interplay has the potential to help VET teachers update their occupational competence.

A survey found that 80.8% of Swedish VET teachers manage and follow up students' workplace learning at least once a year, and teachers consider this task to be important for their connections to and relationships with working life (Andersson & Köpsén, 2017). This work task was more common among VET teachers with a permanent position (82.4%) than for those employed on a fixed-term contract (75.5%), but did not differ between teachers from different vocational programmes. The aim of the work presented here was to further investigate VET teachers' CPD and interplay with workplaces, particularly in connection with students' workplace learning.

Theoretical perspectives

This interview study used the perspective of situated learning (Lave & Wenger, 1991; Wenger, 1998). The situated character of knowledge and learning is fundamental. The concept of 'being competent' refers to having developed an identity, and describes a person who has the knowledge and skills required to engage in the joint enterprise of performing the tasks, interacting with other members, and using the shared repertoire of this practice. Such a person is thus recognized by other members of the community of practice as competent enough to fully

participate in this specific community of practice. It is through participating in a community of practice that an identity develops.

With regard to the occupational practices and occupational identity related to a specific VET programme, we consider the example of a CNC machinist: A person who has an identity as 'CNC machinist' possesses the knowledge and skills required to work with CNC machines and is recognized as being capable to participate in the professional practice of CNC machinists. The knowledge possessed includes familiarity with occupational goals and knowledge of the relative importance of work tasks. The skills possessed include, for example, milling, cutting, and turning wood and metal items for industrial production, and these skills are required in order to be able to use the CNC machines, their software, and other shared resources. A recognized CNC machinist also knows how to communicate and cooperate with other CNC machinists, and uses and understands the language, symbols, values and traditions, etc., of the CNC machinists' occupational practice.

However, as Wenger (1998) argues, a community of practice is not stable but changing. This means that on-going participation, which includes mutual engagement in work actions and social interaction with other members of the community of practice, is necessary to remain competent. In other words, active involvement in today's occupational practice is required in order to possess current occupational competence as a CNC machinist.

Individuals may move between different communities of practice, so-called boundary crossings, in landscapes of practice, and this enables them to learn and develop a nexus of identities (Akkerman & Bakker, 2011; Wenger-Trayner, Fenton-O'Creevy, Hutchinson, Kubiak & Wenger-Trayner, 2015). The theoretical framework applied here leads us to argue that it is through such processes that vocational teachers learn and shape their vocational teacher identity as a nexus of a teacher identity and an occupational identity (Fejes & Köpsén, 2014). A vocational teacher must be competent in teaching and competent in the occupation from which they come and for which the students are being prepared. Thus, VET teachers must possess current competence in their vocational teaching subject in order to meet today's demands for high-quality education. Therefore, in fostering students to develop a vocational identity aligned with today's occupational practice, the VET teacher must be able to use new machines and current software; must have the skill required to perform task alignments with today's required shape and precision, etc.

The interplay between VET schools and workplaces means that different types of boundary process arise (Roberts, 2013; Wenger, 2000). Such processes are significant for vocational education (Berner, 2010; Tanggaard, 2007). VET teachers cross the boundary between the practice of the initial occupation and the practice of VET when they become teachers (Fejes & Köpsén, 2014), and boundary crossings are essential for them in continuing to be competent in the original

occupation and the occupational identity. Boundary processes occur in diverse types of crossing and relationship, such as in various forms of boundary encounter, boundary practice, brokering, and boundary object (Roberts, 2013; Wenger, 1998, 2000). In this way, they include different opportunities for learning.

The idea of situated learning led us to adopt a holistic perspective on VET teachers' CPD, one that included all types of activity they engage in as teachers, in order to improve their work, and that took account of the influence of system factors (Bolam & McMahan, 2004; Day & Sachs, 2004). This study focuses on VET teachers' boundary activities in connection with students' workplace learning, irrespective of whether these activities are intended to be part of VET teachers' CPD. Thus, we include informal and unintentional professional development (Eraut, 2007; Fraser, Kennedy, Reid & Mckinney, 2007).

Aim and research questions

The aim of this study was to examine the conditions and potential for updating occupational competence during the interplay of Swedish VET teachers with workplaces, in connection with students' workplace learning. The research questions were:

1. How are boundary processes with workplaces enacted?
2. In what way can these boundary processes shape the potential for VET teachers' occupational learning?
3. What are the conditions for VET teachers' boundary processes in connection with students' workplace learning?

Methods

Data

This study is part of a larger project to analyse VET teachers' CPD for occupational currency, based on both statistics and on data from surveys and interviews. We report here qualitative findings from the interviews. The respondents were 30 VET teachers representing all 12 national VET programmes, in both upper secondary schools and adult education. The sample included 11 female and 19 male teachers, a distribution that corresponds to the population of VET teachers in Swedish upper secondary schools[1] (SNAE, 2017). VET teachers at schools in both small and large cities were included.

In semi-structured interviews, the teachers were asked to describe their contacts and relationships with working life, CPD in the vocational subject, conditions for work-life connections, and conditions for their professional development. This article presents results obtained from, in particular, the interviewees' answers concerning conditions, learning and contacts with workplaces in

connection with their students' workplace learning. The interviews were conducted in Swedish and transcribed verbatim. Quotations used to illustrate the findings have been translated into English. For each quotation we have indicated the initial occupation of the VET teacher, and when there is more than one teacher with the same initial occupation they are marked with no. 1 and no. 2.

The study follows the Swedish guidelines concerning good research practice (Swedish Research Council, 2017) in terms of such matters as consent, confidentiality, information provided to interviewees, and the use of data.

Analysis

We used the NVivo software for the qualitative analysis of the transcriptions. We initially identified the parts of the data relevant to teachers' work with students' workplace learning. This was followed by a deductive coding and analysis of the data, during which we identified expressions of different types of boundary process against the background of our theoretical perspective and concepts (Wenger, 1998). The key concepts of boundary encounters, brokers/brokering and learning of identity were employed and proved to be useful when answering the research questions of the VET teachers' enactment of boundary processes and how these processes involve teachers' learning.

The study was a limited qualitative investigation that did not allow for generalisations. However, the study increased knowledge about different kinds of boundary process that may occur between schools and workplaces, and showed that various forms of process provide different opportunities for VET teachers' learning. Furthermore, it increased knowledge about how the conditions for boundary crossings and learning are experienced by VET teachers.

Findings

The interplay experienced by VET teachers between school and workplace in connection with students' workplace learning occurs in two forms of boundary process: boundary encounters and brokering. Different degrees of VET teachers' CPD and learning of current occupational competence are possible, and depend on how boundary encounters are enacted. Furthermore, brokering by the students of occupational knowledge and experience from workplaces into VET may also offer opportunities for VET teachers' learning. However, the way in which VET teachers manage the interplay between school and workplaces is governed by their work in school.

Conditions for VET teachers' boundary processes

VET teachers' boundary processes and the opportunities for learning in connection with students' workplace learning are related to structural factors in the VET

institution. The timetable is one factor that has a crucial impact on the conditions for VET teachers' movements between school and workplaces. The way in which lessons are timetabled affects the freedom available to the VET teacher to plan and perform the work tasks related to students' workplace learning, such as visiting workplaces, supervisors, and students to follow up on their learning, etc.

> Yes, yes of course. That's how it is, really. Yes, that is the time we get. Then we have no lessons in here, and so we have an opportunity to be out there. Not only the opportunity, we have the requirement for two, at least two visits in each [placement]/……/ However, some schools set up other classes for VET teachers when their students are out on workplace learning, well, then it becomes difficult for these teachers to visit the students at the workplaces. That's how it is! (Cabinet-maker and VET teacher)

Other structural factors relate to the organisation of VET and the distribution of the responsibility of students' workplace learning among VET teachers.

> Visiting students at their workplaces is the only contact I have with workplaces. But now, it is terrible! They [the management] have changed the division of work. I only visit hospitals and elderly care. Other workplaces [where I have students] are visited by other teachers who aren't nurses, but need to fill out their working hours. These visits are very important for my professional development! (Nurse and VET teacher no. 1)

> It is new here in our school; now we have got an organisation with one person who takes care of this. Instead of everyone doing it. It is better with one person having this focus and taking care of the contacts. Otherwise it is difficult, very difficult to find the time. (Truck driver and VET teacher)

Thus, the distribution of work among VET teachers may be a barrier or a driver for the type of CPD opportunities we analysed in this study. On the one hand, centralising the management of students' workplace learning is seen as positive by some VET teachers, as it reduces their workload. On the other hand, some VET teachers lose the opportunity to maintain relationships with workplaces and the former occupation. A number of VET teachers experience having the full responsibility for their students' workplace learning as positive.

The conditions for VET teachers' boundary processes between school practice and work practice differ, which determines the opportunities for them to learn and update their occupational identity.

Boundary encounters

VET teachers' CPD and their learning of current occupational competence depend on how boundary encounters are enacted. The differences relate to VET teachers' access to workplaces, and their engagement and involvement in actions and social relations at the workplaces.

Individual meetings

A telephone call or an individual meeting with a student's supervisor at the workplace is a boundary encounter in the form of a one-to-one conversation.

One VET teacher described how the school organised their students' workplace learning such that 'the students themselves can suggest where they want to do their work practice and then we will call [the workplace] and ask if it is possible'. Telephone calls can sometimes be the only contact for planning and following up if the students' workplace learning is situated far away from the school. (This is often the case with some VET programmes, where students come from all over Sweden.) Telephone follow-up also occurs extensively when VET teachers have many students spread across the region and insufficient time for visits.

An individual meeting occurs when the VET teacher pays a short visit to the workplace to see the supervisor for a talk or to follow up the student's placement and workplace learning. VET teachers explained that these individual meetings are often brief due to lack of time, and they focus on the student's behaviour and ability to learn for future employability. As the following example shows, it is not just the VET teacher who may be short of time: the professionals may also be busy, which limits the VET teacher's access to activities, and interactions between the VET teacher and the professional.

> It is not possible for them [the professionals] to have me there for very long. The meeting with the supervisor can be up to three quarters of an hour, I guess. (Child-care worker and VET teacher no. 1)

One-to-one conversations are limited opportunities for VET teacher's learning, as the interaction with others in the workplace is limited. The extent of learning that occurs depends on the nature of the dialogue between the VET teacher and the supervisor. If this includes supervisor's stories and descriptions of current occupational practice, the VET teacher may learn through images of work and social interactions.

Tripartite conversations

A tripartite conversation is a planned and systematic conversation that focuses on the student's workplace learning, and that takes place away from the workplace in order to avoid disturbance or interruption. Such a conversation between the VET teacher, supervisor and VET student is recommended to follow up periods of workplace learning (SNAE, 2013). In the work presented here, tripartite conversations were interpreted as a special kind of boundary encounter. One VET teacher described these tripartite conversations as opportunities to learn and update her knowledge of occupational nursery and pre-school practice.

> When we have a tripartite conversation, things may come up that I do not really understand, or there may be something new that has been introduced. Then I ask the supervisor, as I want to know how it works, and how it is supposed to be. (Childcare worker and VET teacher no. 2)

The conditions for interaction between those involved differ somewhat from those in the case of short individual meetings. The conversation includes three individuals' competences and experiences. Further, the conversation is descriptive and offers opportunities for questions and explanations, which means that this kind of boundary encounter may be an opportunity for VET teachers to learn about current occupational practice. However, even if these meetings are considered to be important by the VET teachers and may provide opportunities for CPD, this kind of boundary encounter offers limited access to current work activities and social interactions with the professionals.

Workplaces visits

Different forms of workplace visit are a common way for VET teachers to fulfil their responsibility for students' workplace learning. The descriptions range from short visits to the worksite, and – as one VET teacher expressed it – 'looking in the logbook what he [the student] has done', to longer visits with walks around the workplace. Visits to workplaces are one kind of boundary encounter, and they give VET teachers access to the work and opportunities to interact with the persons engaged in it. VET teachers describe these visits as relevant to them as vocational teachers. Many of the teachers give examples similar to this:

> It is my responsibility to visit them [the students], then I have the opportunity to learn, ask, watch… see if there are any innovations. (Cabinet-maker and VET teacher)

Other examples in our data include teachers' statements of an intention to support the student's learning through asking questions about work practices, which at the same time creates opportunities for their own learning.

> …. when visiting workplaces, you talk to them [the professionals] and hear the latest news. You don't just talk to the student or about the student, you talk about the work, in order to involve the student so that he will understand work practice. Things like 'Why do you do it this way? What material do you use for this task?' That way I also get some input! (Construction worker and VET teacher)

> During workplace learning periods, when I visit the workplaces, I don't just ask about the students, but I also use some of that time to ask how things are going in the industry. What's new and such like? I draw up a list before the visit. I want to be updated about the industry. (Salesman and VET teacher)

These examples show that visits to workplaces that include access to the work and social interactions provide a potential for learning other than the potential that arises when talking to a supervisor or having a tripartite conversation. The examples above illustrate the opportunities that VET teachers have for observing

professionals in action and interacting with them. Teachers described how the professionals sometimes showed them innovations, such as machines, materials and resources, not just when asked, but also unprompted. In some cases, VET teachers were invited to practise a work task or examine the material used. When asking questions about current occupational practice, or planned changes and new procedures, the VET teachers have the opportunity to learn about today's work and learn about future occupational practice. This includes, for example, the need to change work and come into alignment to other practices.

However, some VET teachers argue that learning by visiting students at the workplaces is insufficient.

> It's not really a matter of skills development for me. I walk around, talk to the CNC machinists, check what the students have done, and also pick up new things for myself. That's how it is. But not enough really! To keep this skill … you lose it, because skills have to be kept alive. You need to work with your hands! (CNC machinist and VET teacher)

This VET teacher points out that a visit does not help him to maintain his practical skills. Another teacher in a similar programme talked about the risk of losing the tacit knowledge of how to operate a CNC machine, such as the ability to recognise the sound of a perfectly set machine. Visits to workplaces offer the potential for learning, but not in the same way as engagement and interaction in authentic work situations.

Participating in work

Authentic situations for learning will occur when a VET teacher is given the opportunity to participate in occupational practice for a day or more. This is a kind of boundary encounter that is embedded into everyday work that lasts longer than a short visit, and thus, may include several activities and social interactions.

The following two examples show boundary encounters that combine the VET teachers' intentional learning with the teachers' planning and follow-up of their students' workplace learning.

> There will always be a visit to the workplace to prepare for an upcoming period of workplace learning. At our school, we sometimes do some work in that workplace in order to get somewhat up-to-date. I then have the opportunity to talk to the supervisor and plan the training for the student… while I'm there. (Team leader in hotel and conference, and VET teacher)

> It does happen that I spend a full day at a restaurant working alongside my student. Of course, I am concentrating on the student, but I still notice what they are talking about in the restaurant, what's up, what's going on and what menus they have. I pick up menus and wine lists, and ask what they [the professionals] think about them, and so on. (Chef and VET teacher)

The VET teachers are given access to a form of participation that allows their engagement and involvement in actions and social relations with the members of the communities of practice. When participating in authentic situations, the

VET teacher has the opportunity to interact with other professionals, perform current work tasks, and use current resources, such as administrative systems for hotel management, or ovens that use new technology. Asking questions and discussing such items as menus and wine lists are expressions of a form of participation that involves getting to know how tasks, products and resources are adapted and developed to fulfil contemporary demands and wishes. This form of authentic participation entails a wealth of potential for learning and updating an occupational identity.

Students as brokers

Brokering activity by VET students of occupational knowledge and experience from the workplace into school practice is another form of boundary process that occurs during students' workplace learning. This brokering may include opportunities for the VET teachers to learn.

> When students have had their workplace learning, I ask them how this work task is performed nowadays? What do they do? What material do they use for this? And sometimes I tell the students to pick up some compresses and some materials so that I can see what is being used out there. (Nurse[2] and VET teacher no. 2)

VET teachers ask their students to talk about innovations when they come back to school from their periods of workplace learning. Some VET teachers even give the students the task of collecting information about new materials and new techniques. Furthermore, it may also happen that students bring experiences and artefacts from working life back into school practice without being explicitly asked to do so. A VET teacher and motor mechanic described how he once discovered a student handling a task in a new way, and through this he learned how such problems are solved in today's occupational garage practice.

The interviewees describe students' brokering of new elements from work practice into school practice primarily as contributions to teaching. The students are encouraged to reflect on their workplace learning, and to share their occupational knowledge and experiences with other students. However, the VET teachers say that the students' brokering is also intended to be an opportunity for them as teachers to learn about current occupational practice. In terms of boundary processes, this is a reconstruction of workplace practice (Berner, 2010), and a transfer of knowledge from one practice into another practice, and in this way providing opportunities for development at different levels (Akkerman & Bruining, 2016). The development may be on the level of the individual in the form of teachers' learning, and at the level of the institution in the form of changing the content of the school's teaching practice. However, the practice of the school must allow such boundary processes if these opportunities for learning are to be exploited. In other words, the opportunities for learning for students and teachers depend on the situation at the school and how transfer of knowledge by the students is arranged and supported in VET.

Discussion

The relationships of VET teachers to working life are critical for the teachers to maintain occupational currency in the subject that they teach. This may be challenging, particularly if VET teachers, as in Sweden, usually have a full-time employment as a teacher. The aim of this article has been to investigate how boundary processes between school practices and work practices in connection with students' workplace learning can create the potential for VET teachers' learning of current occupational competence (cf. Broad, 2016). The article has been written from a situated learning perspective (Wenger, 1998). We have identified several kinds of boundary encounter between VET teachers and workplaces, and we have examined the brokering by VET students of occupational knowledge and experience from work practice into school practice. We have defined these as 'boundary processes', which offer the potential for VET teachers' CPD in their vocational subject. The degree to which learning is possible depends on the VET teacher's access to the occupational practice and networks, and his or her engagement and involvement in work activities and social interactions (cf. Broad, 2015). Structural factors in the practices of the school also determine the conditions for boundary processes between school and workplaces, and in this way affect the potential for VET teachers' CPD during students' workplace learning.

VET teachers take part in several activities that they perceive to be valuable for CPD (Andersson & Köpsén, 2017). The qualitative findings presented here confirm that VET teachers' duties and work tasks related to students' workplace learning create value. However, the way in which VET teachers perform these tasks influences the potential for learning and their opportunities for CPD in their teaching subjects. The frequency and duration of workplace visits by the VET teacher affect his or her ability to retain occupational competence. How much the VET teacher engages in day-to-day work and interacts with other professionals at the workplace is particularly important for the ability to acquire current occupational identity. Thus, the more the teacher participates authentically in work, the greater is the potential for CPD. The way in which the VET teacher chooses to undertake the tasks in connection with students' workplace learning is highly significant.

However, the work presented here shows that the form of VET teachers' participation in occupational practice probably depends on the institutional conditions for the boundary crossings they experience. Structural conditions of school practices influence the frequency and duration of boundary encounters between the VET teachers and workplaces. The amount of freedom that VET teachers have for the frequency and nature of their participation in the planning and following up of students' workplace learning depends on how the responsibility for students' workplace learning is distributed among the teachers and how lessons are timetabled.

The nature of VET teachers' participation in working life probably depends also on the relationship between the teacher and the workplace. VET teachers stress the importance of close relationships with workplaces. Regular and recurrent contacts with a workplace, not only concerning students' workplace learning, will probably facilitate the VET teacher's access to the workplace and thus, increase the opportunities for learning through visits and possibly also participation in the daily work. Institutional conditions influence the VET teachers' opportunities for close relationships with workplaces. It is also probable that the balance that a VET teacher establishes between the teacher identity and the occupational identity affects the relationship with workplaces (Fejes & Köpsén, 2014). VET teachers who stress their occupational identity and those who manage to balance the dual identities are probably more likely to participate in occupational practices in their spare time or develop networks related to the occupational field and thus maintain their relationships with workplaces.

Boundary encounters that are part of daily work in VET are potential occasions for VET teachers' CPD. This conclusion is valid for the Swedish context studied here, but should be valid for all VET teachers who need to possess current occupational competence. Institutional factors and the relationships between VET teachers and workplaces are important conditions for how these boundary encounters are enacted and thus, the potential offered for CPD. However, such opportunities for informal learning integrated into the daily work of VET teachers (Bound, 2011) require that school managers pay attention to the needs of VET teachers for CPD in their occupational identities and the opportunities for CPD offered in VET teachers' work. Furthermore, it is crucial that VET teachers recognise students' workplace learning as an opportunity for their own occupational learning, and they should thus choose how to plan and follow up their students' workplace learning with care. This planning and follow up should consider the importance of access, engagement and involvement in work and social relationships at the workplace.

Working life is constantly changing and CPD of VET teachers is necessary to secure the quality of VET. The vocational subject knowledge should have industrial currency to guarantee this quality. In order for VET teachers to maintain and develop expertise from their initial occupation, and thus being competent as VET teachers, it is crucial that they have the work conditions and opportunities to participate in authentic work at workplaces. Findings in our study show that VET teachers' different kinds of boundary encounter with workplaces in connection with students' workplace learning offer updating of teachers' occupational competence – however, to different degrees. The participation of VET teachers in authentic work situations entails a wealth of potential for learning and updating of occupational competence. This form of participation as well as VET teachers' ongoing relations with workplaces, not only in connection to students' workplace learning, are crucial for the quality of teaching and of VET in general.

Endnotes

[1] Corresponding statistics for adult education are not available.
[2] It should be noted that the initial occupation of Swedish VET teachers is normally the occupation in which they become VET teachers. However, this is not the case for the healthcare programme, where VET teachers who teach assistant nurses-to-be usually have a background as nurses.

Acknowledgements

Notes on contributors

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