Students' Vocational Learning: Enabling Conditions for Putting Knowledge to Work

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Abstract

The purpose of this chapter is to contribute knowledge about school-related and workplace-related conditions that enable students' vocational learning during workplace-based learning within vocational education. The research underpinning the chapter draws on evidence from a research project on students' vocational learning in the industrial vocational education program at six different Swedish upper secondary schools. The theoretical concept of recontextualization contributes to uncovering the dynamic conditions that enable students' vocational learning as they bring knowledge from the school context to the workplace context and back in vocational education programs. The argument is that both

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school- and workplace-related conditions must support putting knowledge to work in the workplace context. The ways in which different types of knowledge are put to use form the basis for examining how school-related and work-related conditions can support students in their vocational learning. The students' ways of making sense of workplace-based learning as an extension of their educational program and of putting knowledge to work in the workplace are connected with their identity formation processes. Students use different learning strategies to bridge school-based and workplace-based knowledge that support changes in the workplace. The implications of this study are discussed in terms of potential changes in practices for vocational learning in the context of vocational education.

Keywords
Vocational education · Workplace-based learning · Vocational students · Recontextualization

Introduction

This chapter contributes to contemporary research on vocational learning and the long-standing challenges of integrating school-based and workplace-based learning in vocational education. Vocational education and young adults' school-to-work transition constitute a well-established research field. However, knowledge gaps remain, and many questions are still unanswered within the field. There is emerging research regarding the nature of vocational learning for students who alternate between school-based and workplace-based learning and thus move between different learning contexts, in developing relevant vocational learning within vocational education programs (Endedijk and Bronkhorst 2014). This overriding international trend is widely reflected in the development of vocational education and the requirements from both educational institutions and the work life to better integrate theoretical and work-specific knowledge into vocational education (Littke and Thång 2015).

In Swedish upper secondary school vocational education, there has been a renewed interest in workplace-based learning and apprenticeship in an attempt to counteract the dual problem of high youth unemployment and shortages of skilled labor and to strengthen young people's direct access to the labor market (Persson Thunqvist 2015). Similar discussions and policy trends have been highlighted in several other countries as well, for instance, Finland (Virolainen and Persson Thunqvist 2017), the UK (Fuller and Unwin 2009), and Canada (Lehmann et al. 2014). In addition to preparing students for specific qualifications and occupations, vocational education must also promote lifelong learning and ensure further career development in the case of structural transformation (e.g., geographical redistribution of work, the closing of industries). Demands to bridge the gaps between education and work have also been fueled by globalization, digitalization, and new work organizations (Lauder et al. 2006).

Learning in formal educational institutions and workplace settings is often viewed as different processes with separate structures (Billett 2011), and school- and workplace-based forms of learning have different rationales that may affect students' vocational learning and create different conditions for their learning (Schaap et al. 2012). A vocational education program that alternates between school-based and workplace-based learning implies a holistic view of vocational education that integrates theoretical knowledge with work-based knowledge and goes beyond a theory–practice dichotomy (Evans et al. 2010). However, as such integration does not come easily in practice, it remains significant to deepen the understanding of conditions that enable or constrain students' learning within vocational education programs in which students go back and forth between school-based and workplace-based learning. Understanding of how such vocational education programs can be developed both for and by the students and of the conditions that enable (or constrain) vocational learning in the workplace context must be advanced (Guile and Evans 2010).

The purpose of this chapter is to contribute knowledge about school-related and workplace-related conditions that enable students' vocational learning during workplace-based learning (in the workplace context) within vocational education. The chapter draws on evidence from a research project on vocational learning based on interviews with 44 students (33 boys and 11 girls) enrolled in the industrial vocational education program at six different Swedish upper secondary schools. The research evidence is used to illustrate school-related and workplace-related conditions that enabled the students' vocational learning in vocational education. The contribution of this chapter lies in its input into the ongoing discussion of the challenges of relating different forms of knowledge and learning in vocational education, including the long-standing, seemingly intractable problems of interconnecting theory and practice in vocational education.

The chapter has four sections. The following section provides a brief contextual description of the current state of the vocational education system in Sweden, particularly vocational education in upper secondary school. The subsequent section introduces the theoretical framework, which is inspired by Evans et al.'s (2010) theoretical model that is used to analyze students' vocational learning in vocational education programs in which students alternate between school and work. This model offers an alternative way of analyzing students' vocational learning in which the underpinning assumption is that all knowledge has a context that includes traditions, norms, and practices and that knowledge learned in the school context can be recontextualized, that is, put to use in the workplace context. Our argument is that learning conditions must also support putting knowledge to work in the workplace context. In the following section, school- and work-related conditions for vocational learning are discussed, and some examples from research are provided. The ways in which different knowledge is put to use form a basis for examining how school-related and work-related conditions can support students in their vocational learning. Finally, some conclusions are presented.

The Current State of Vocational Education in Sweden

A brief description of the current state of vocational education in Sweden is provided to establish the context of the Swedish vocational education system. Since the early 1970s, initial vocational education has been an integral part of a state-governed upper secondary school system that targets almost all 16- to 19-year-olds. At present (since 2011), there are 18 national programs, 12 of which are vocationally oriented. All vocational education programs last for 3 years and comprise a mix of school-based education and workplace-based learning. Upper secondary schools are responsible for providing apprenticeship as a complementary track along with school-based vocational programs. Goals and syllabi for these two pathways are formally the same, but students in apprenticeship education spend at least half of their time at one or more workplaces. All programs lead to a vocational exam administered by the school (Swedish Agency of Education 2017).

In addition, all vocational education programs formally provide basic eligibility for higher education. All students in upper secondary school are required to pass mandatory core courses (e.g., mathematics, Swedish, English) at a level that is sufficient for entry into higher education. This also makes it possible for vocational students to shift between programs if they find that they have made the wrong educational choice. The vocational education programs typically start with a broad introductory year. During the second and third years, the educational system provides more specialized vocational courses and workplace-based training within vocational fields such as industry work, construction work, auto mechanics, health care, and business and administration (Persson Thunqvist 2015).

In comparative research on different vocational education systems in industrialized countries, Sweden is often discussed within the framework of a "Nordic egalitarian model of education" (Dobbins and Busemeyer 2014). The model is characterized by publicly funded comprehensive school systems guided by the principles of equity, democratic participation, and welfare (Antikainen 2006). Historical comparisons (Michelsen and Stenstrom 2018) of the postwar Nordic vocational education systems reveal how the strong political force of the Social Democratic Party has struggled to reduce the distance between general education and vocational education and to promote equal access for further studies for all young people, irrespective of their social backgrounds. However, the national policy strategies for improving the quality of vocational education in relation to general education differ among the Nordic countries. For example, the school-based systems in Sweden and Finland are generally distinguished by attempts to integrate vocational education and general education, while those in Denmark have been characterized by attempts to modernize the apprenticeship system and thus protect the specific nature of vocational training (Persson Thunqvist and Jørgensen 2015). In the Nordic context, the Swedish vocational education system is the most clear-cut example of the Nordic model of education in terms of the role and function of vocational education. Hence, it represents a kind of natural experiment regarding the challenge of integrating general and vocational education to provide access to both skilled employment and further studies (Jørgensen et al. 2017).

However, in practice, such integration has remained a challenge for policy-makers and educational scholars in the past decades. Since 1994, all vocational education programs have been organized to provide better general education and basic eligibility for higher education. A trade-off, however, was that the direct links between upper secondary school vocational education and work life weakened, and transitions from school to work become complicated in several vocational fields (Olofsson and Persson Thunqvist 2014). In the new millennium, vocational education has been subject to renewed reforms to manage this challenge. By bringing educators and representatives of the work life together, political efforts have aimed to develop frameworks for cooperation between schools and workplaces at the central and local levels (Persson Thunqvist 2015). The initiators of the most recent school reform, in 2011, emphasized the importance of conducting workplace-based learning at a learning site that is equivalent to school (SOU 2008). At the same time, according to the educational goals, general education, vocational education, and workplace-based learning should be integrated to form a whole (Swedish Agency of Education 2013). A main challenge for school organizations and social partners is to jointly implement the intended curriculum in practice. In addition, the student perspective regarding this challenge is important to consider. However, vocational students' workplace-based learning within Swedish upper secondary school is largely under-researched (Ferm et al. 2017).

Vocational Learning: Alternating Between School and Work

The theoretical framework presented in this section is inspired by a theoretical model developed by Evans et al. (2010) to analyze students' vocational learning in vocational education programs in which students alternate between the school and work contexts. The model is based on the theoretical assumptions of situated learning (Lave and Wenger 1991; Fuller and Unwin 2009). From a situated learning perspective, learning is social and is defined as a process of participation in and between communities of practice where interaction in activities, mutual engagement, and a joint repertoire (e.g., methods and routines) are important elements for developing vocational knowledge and future vocational identities (Wenger 1998). The concepts of community of practice and legitimate peripheral participation have been developed to describe apprentice learning and identity formation in analyses of the social and pedagogical processes involved when a "newcomer" becomes an "old-timer" in the practice of a shared activity (Lave and Wenger 1991). Although Lave and Wenger's seminal work does not particularly focus on the role of the school-based part of vocational education in the newcomer's learning process, the situated learning approach to vocational learning has been applied and further developed in research regarding how conditions for modern forms of apprenticeship are shaped by student participation, formal educational contexts, and the institutional arrangement of workplace-based learning (Fuller and Unwin 2003). The concept of expansive and restrictive learning environments has been developed to identify conditions that enable and constrain different types of workplace learning, adaptive and

expansive learning (Ellström 2006; Fuller and Unwin 2004), and different approaches to apprenticeship (Fuller and Unwin 2003). An expansive approach to apprenticeship is associated with expansive learning (Engeström 2001); that is, learning that is closely related to the transformation of vocational education and the conditions for students' vocational learning may depend on the degree to which school- and workplace-based knowledge is integrated into vocational education. In contrast, the restrictive approach is associated with the adaptive learning of vocational knowledge.

The model of Evans et al. (2010) offers an alternative way to analyze the interplay between school-based and workplace-based learning and how different forms of knowledge are recontextualized by students as they use knowledge and move between learning contexts at school and in the workplace. All vocational knowledge that a student learns is thus dependent on the context, i.e., whether learning occurs at school or in the workplace. Context is often understood as settings or places, but Evans et al. (2010, pp. 246) extend the use of the term to include the "schools of thought," traditions and norms of practice, and life experience in which different kinds of knowledge are generated. This dynamic account of context is comparable with theoretical developments in other disciplinary fields, such as dialogic and interaction research regarding communication, cognition, and discourse (Goodwin 2000; Linell 1998), in which the notion of "recontextualization" is fundamental. While recontextualization was originally a text-based notion (e.g., implicated in the work of Bakhtin 1981) referring to the dynamic transformation of something from one discourse to another (Linell 1998, pp. 154–155), in this chapter, the notion will be assigned broader applicability in vocational education.

In the context of Swedish vocational education, the notion of recontextualization has been used in studies demonstrating the hybrid nature of project-based vocational programs organized in close collaboration with head teachers, vocational teachers, students, and professionals (Linell and Persson Thunqvist 2003; Persson Thunqvist and Axelsson 2011). In such complex learning environments, where different knowledge traditions are simultaneously at play, it can be relevant to discuss contextual configurations (Goffman 1974; Goodwin 2000) and elements from different contexts (e.g., school and work life) that are updated and reappropriated on a moment-to-moment basis in teaching and learning. In Goffman's terms, recontextualization usually amounts to reframing. When knowledge or traditions of knowledge are relocated from one context to another, they are subject to change, requiring new ways of seeing things and responding to them (Goffman 1974). Under these circumstances, knowledge is also sometimes subject to textual changes (e.g., changes in the educational curriculum), such as simplification, condensation, elaboration, and refocusing (Bernstein 1990). Bernstein (1990, pp. 59–61) used the term recontextualization in the discussion of the reproduction of educational discourse.

In this chapter, a slightly modified version of the model by Evans et al. (2010) is applied as an analytical framework (Fig. 1). Vocational students are required to progressively use and relocate knowledge from the school to the workplace context and back to learn their vocations. The application of school-based and work-based knowledge provides students with resources for dealing with problems in the workplace (Guile 2012).

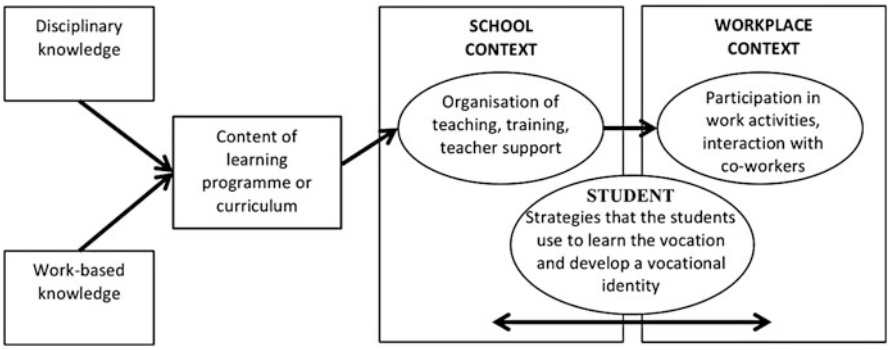

Fig. 1 Theoretical model for analyzing vocational learning in vocational education programs in which students alternate between school-based and workplace-based learning. (Adapted from Evans et al. 2010, pp. 247)

The model illustrates that disciplinary and work-based knowledge shapes the vocational programs' curricula and thus influences the courses and knowledge that students require to enter a specific vocation. Vocational education programs are struggling with the pedagogical challenge of meeting the requirements of both school and work life when designing programs that integrate disciplinary and work-based knowledge (Evans and Guile 2012) and that provide students with a meaningful, whole vocational learning (Littke and Thång 2015). In the school context, students encounter contextualized "real-life" cases that are used to prepare them for their new vocation. Vocational teachers have a key role in vocational students' learning; they give students access to relevant vocational experiences and function as intermediaries between school and work life (Persson Thunqvist and Axelsson 2012) by contributing to the school's formal goals and informal expectations (Billett 2011).

A conventional assumption in previous research is that the workplace as a learning environment is highly important for students' vocational learning. However, merely being present in a workplace is not adequate to allow students to apply the knowledge gained in the school context to the workplace context. When students enter the workplace, vocational learning is not restricted to training in specific skills; it also entails knowledge about activities, roles, and social practices and to vocational identity formation (Evans and Guile 2012). Opportunities to participate in workplace activities and interactions depend on both the learning environment provided to the students (i.e., good or poor conditions for vocational learning) and how the school-based and workplace-based parts of a vocational program are organized (Fuller and Unwin 2003).

Another central aspect of the model illustrates the importance of recognizing what the students themselves do to integrate knowledge gained from school and their workplace-based learning to meet their own learning needs. The school and workplace contexts shape and guide the students' learning of a vocation, but they emphasize different requirements for the vocation and what students need to learn

to meet those requirements. In a sense, students are boundary crossers because they alternate between school and workplaces (Akkerman and Bakker 2012). Students develop and use different strategies to integrate the knowledge they gain from the different contexts, and some strategies, such as asking questions and identifying role models from whom they learn the new vocation, are prompted by the individual student's prior experiences and personal characteristics (Ferm et al. 2017). As Evans et al. (2011) argue, the learner's recontextualization occurs through self-chosen strategies that entail understanding the demands of the chosen vocation and, above all, the learner's motivation to join it. For students, the challenge is to form a personal strategy that makes use of both school-based and workplace-based knowledge to gain the knowledge, skills, and insights they need to learn, develop a vocational identity, and meet the demands of their chosen vocation.

Conditions for Vocational Learning

This section presents an empirical study of students' vocational learning based on qualitative interviews with 44 students (33 boys and 11 girls) enrolled in a vocational (industrial) education program at six different Swedish upper secondary schools. Due to the large amount of data and the space limitations of the chapter, the findings are portrayed relatively briefly, focusing on key features of the school- and workplace-related conditions that enabled the students' vocational learning and the ways the students themselves shaped their learning conditions to put their knowledge to use in their workplaces.

School-Related Conditions for Vocational Learning in the Workplace

Several school-related conditions served as a bridge for preparing the students' entrance to the workplace and could later support their learning in workplace settings. For the students, it was important to receive as much preparation as possible at school before beginning their workplace-based learning. Student readiness is an important condition related to their ability to make informed decisions about a chosen vocation and engage effectively in vocational education toward a career for which they are suited (Billett 2011).

In school workshops, the students encountered content and work methods involving contextualized "real-life" cases that prepared them for the vocation as an industrial worker. The important condition in these authentic situations was that the students were permitted to make mistakes and had opportunities to reattempt tasks. Like the students in Berner's inquiry (2010), the students in this study perceived the school environment as a safe and inclusive place to learn from mistakes. In contrast to classroom teaching, school workshop training was characterized by intense interaction between the students and experienced vocational teachers, tools, and machines. Gradually, the students were given more challenging tasks with the support of the vocational teachers. This support from vocational teachers was a

crucial condition for the students' learning. The teachers were key people who provided the students with access to vocational experiences and served as intermediaries between school and work life (Persson Thunqvist and Axelsson 2012). The students recognized the vocational teachers as role models who helped the students with instructions for handling different specific tasks, such as welding and sheet metalworking or CNC (computer numerical control) machining and turning. The vocational teachers often translated the informal requirements of the vocation to the students. The vocational teachers' knowledge was recontextualized in their teaching and training; that is, it was visible in the teachers' pedagogical assumptions regarding the vocational qualifications the students had to acquire informally and the formal curriculum goals that they should achieve (cf "pedagogic recontextualization"; Evans et al. 2011).

Knowledge gained in the school context was, as the students said, a "springboard" for continuing to learn the vocation in the workplace. It seemed crucial for the students to have a minimum base of "correct" vocational knowledge to feel capable of handling certain work tasks and to face emerging problems when they entered the workplace. In some schools, the students had the opportunity to learn specific work tasks that required licensed skills, such as welding and forklift driving, and occupational safety certification. Obtaining a certification demonstrating that they had the necessary skills was a significant condition for gaining knowledge that could immediately be put to work in the workplace.

Additionally, local school regulations and the curricula for the vocational educational program created mutually interacting conditions that, in turn, framed the students' vocational learning in terms of establishing the learning goals and learning activities that they should achieve in the school. As noted by Billett (2011), even though students have similar curriculum pathways for learning in vocational program, their learning is regulated by the local school context. Some students described practical barriers in the organization between subject-based courses and workplace-based learning, which affected their access to learning opportunities both at school and in the workplace. The subject-based courses simply did not fit schematically into the workplace-based learning placement period. For instance, students who aspired to apply for university studies had difficulty qualifying because preparatory courses, such as mathematics and English, conflicted with the students' workplace-based learning. Vocational students who meet the requirements for both theoretical and vocational subjects receive a so-called double diploma, which is necessary to continue to higher education in the Swedish school system.

The students complained that the content of the preparatory courses had no or a limited connection to the industrial work. For example, the courses lacked industry-theoretical knowledge, such as tool names in English (as many companies had English-speaking co-workers and customers). These insufficiencies indicate that vocational education should prepare students in broader competencies, particularly as workplaces are becoming more diversified and production systems and work methods in the industrial sector more specialized (Olofsson and Persson Thunqvist 2018).

Conditions related to the organization of the school- and workplace-based parts of a vocational program can also be partly attributed to generic learning differences

between school and work contexts in that the former follows the logics of education and the latter the logics of work (Akkerman and Bruining 2016). To overcome organizational differences and meet the students' learning needs, the vocational teacher at the school usually followed up in planned meetings with the workplace supervisor and the student, in which time was set aside for reflection and discussion of the students' work experiences and personal development. In these three-part meetings, the focus was not only on the students' vocational learning but also on building strong collaborative relationships with the company. These meetings were a necessary condition that functioned as an organizational bridge between the school and the company. Therefore, the students understood the school would get a bad reputation if they misbehaved during their workplace-based learning.

Workplace-Related Conditions for Vocational Learning

The workplace environment was highly important for the students' vocational learning because it allowed them to gain specific industrial "know-how" during workplace-based learning. Opportunities to participate in workplace activities and to interact with supervisors and experienced co-workers depended on whether the workplace learning environment provided good or poor conditions for learning and developing vocational skills (Fuller and Unwin 2003) in the companies. Each student had a formal supervisor. Previous research has shown that a formal supervisor in the workplace is crucial for students' learning; furthermore, in the Swedish context, students are required to have formal supervision during workplace-based learning. Nevertheless, the support that the supervisors provided varied. Some supervisors offered substantive learning support, while others did not provide the support that the students expected to receive in the workplace. In case of unsupportive supervisors, co-workers were committed to providing the students with access to different forms of guided learning, such as coaching, peer support, answering questions, and providing practice opportunities as part of everyday work (Billett 2000). Experienced and skilled co-workers with good teaching abilities were particularly appreciated as they could create valuable learning opportunities by demonstrating and explaining how and why production routines and work tasks were organized in a certain way. Opportunities to participate actively in different work activities and interactions with experienced co-workers were paramount for allowing the students to learn the skills necessary for their chosen vocation and to develop a vocational identity (Evans et al. 2010). The students stated that the co-workers provided a trustworthy progression of the knowledge, skills, and insights they needed to learn to meet the demands of the vocation and to proceed from simple to more demanding task as their capacities increased. However, the co-workers did not expect the student to be fully trained.

Some students had the freedom to choose what task they wanted to do and with whom, which gave them highly appreciated insight into the vocation's various duties and the production process at the company. In contrast, other students had more limited opportunities due to a restricted learning environment in the welding box;

they performed a single welding task of putting together two pieces. However, a necessary condition was that the students were permitted to participate regardless of the nature of the task. A few companies had difficulties due to reduced production and staff cutbacks, which in turn were reflected in the students' poor learning opportunities (Fuller and Unwin 2004). As seen, the workplaces could not provide a uniform practice, and there were very diverse conditions related to access to work activities for learning the vocation.

The workplaces' experience with having apprentices also proved to be an important social condition for how the students' learning progressed and gradually gained acceptance as members of work communities in the workplace. In this regard, the size of the company was a significant condition. Large workplaces could offer the students more specialized tasks, while some small workplaces could offer more diverse tasks (cf Billett 2011).

The geographical locality also mattered. In Swedish towns where large or middle-sized industrial companies are established internationally, the companies usually also play a significant role in securing employment for community members and contribute to economic development in the localities. It is also in the interest of the company to maintain a good local reputation to recruit and attract committed vocational students from upper secondary schools. This implies that it is not only specific workplace settings that attract students but also the prestige and career opportunities associated with certain companies. In addition, companies that had established a long-standing cooperation with the schools seemed to facilitate a wider range of work activities for students to experience. Such beneficial conditions also appeared to provide what Wenger (1998) has called "breaks in routines," that is, chances for students to discuss and reflect upon their experiences with work and production routines. In cases of smooth collaboration between the company and school, work-related conditions for learning and school-organized pedagogical methods could reinforce each other to promote such reflexive learning practices and potentially widen the students' learning horizons.

Individual-Related Conditions for Vocational Learning in the Workplace

In addition to school- and work-related conditions for vocational learning, individual students shaped their learning conditions as they moved from the school to the workplace. What the students themselves did to bridge school-based and workplace-based knowledge was important for creating learning conditions that could satisfy their own learning needs in the workplace. A prerequisite individual condition, however, was that the students were inclined to work in the industrial sector and had the right attitude toward a vocation as an industrial worker. The students understood the employers valued their suitability and fitness for the vocation (cf Billett 2011), and social skills were often regarded as more important than industrial and technical skills (Nielsen and Tanggaard Pedersen 2011). The ways in which different types of knowledge were put to use by the students formed a basis

for examining how school- and work-related conditions can support their learning trajectories and transitions from school to workplaces. A significant question is whether vocational students can find ways to integrate the different forms of knowledge, perspectives, and cultural traditions they may encounter in different contexts (Tuomi-Gröhn and Engeström 2003). In particular, it is very difficult for students when collaborative relationships and organizational ties between school and workplaces are weak as it may lead to discontinuities in students' vocational learning across different learning contexts (Persson Thunqvist 2015).

At the same time, whether school-based and workplace-based knowledge will be integrated depends on the students' chosen learning strategies and capacities (Ferm et al. 2017). To be accepted as a member of the work community and, presumably, achieve status despite being an apprentice required not only displaying interest but also actively positioning oneself as a resource for co-workers. The students worked as hard as their workmates and tried to catch up with the work tempo and to be alert when they were asked to perform particular tasks. Therefore, learning strategies that the students used frequently to gain deeper vocational knowledge were asking question and searching for role models that could serve as informal supervisors (Ferm et al. 2017). The students' active engagement created more learning opportunities, and the more they were accepted, the more they were trusted to perform more advanced tasks. The students' personal agency was also reflected in the way they spoke about their own individual responsibility. They accepted a great amount of individual responsibility in gaining access to work tasks, supervision, instructions, and explanations from co-workers.

Consequently, the students' active learning strategies were clearly oriented toward the workplace context and their future employment. However, work and employment were not the only sources of these students' attitudes, aspirations, and commitment to learning new things in the workplace. First, the students' learning strategies cannot be viewed in isolation from their participation in upper secondary schools. As previously mentioned, the workplace-related conditions provided opportunities for the students to apply the specific vocational skills and knowledge they learned in school-organized workshops. However, as Swedish upper secondary school vocational education is also distinguished by a relatively strong academic orientation (e.g., in subjects such as mathematics, Swedish, and social science), the students were educated to consider themselves active learners. The universal comprehensive school system generally privileges the value of democratic participation. Students' school-based situated learning has been characterized in terms of negotiated participation (Persson Thunqvist and Axelsson 2012), which refers to the ways in which students (or groups of students of similar ages) recurrently negotiate with their teachers to determine how their learning should be organized. Similar forms of negotiated participation are not expected in workplaces, where students are on their own and must adapt to new circumstances that are quite different from school. However, the students in the present study brought along their school experiences and searched for role models among their co-workers. The workplaces that received students from upper secondary schools on a regular basis seemed to transform the everyday workplace into pedagogical environment (Unwin et al. 2007). Such a

change in the everyday work environment may imply the development of workers' skills in articulating and explaining tacit knowledge regarding production work and being able to answer the students' questions.

Second, the students' social background also constitutes a relevant condition; that is, it contributes to their disposition for learning and the development of a vocational identity in workplaces (Evans et al. 2006; Evans and Kersh 2004). Additionally, several students had parents and relatives who were working in the industrial sector. In these cases, the students were familiar with the informal constituents of industrial culture in local workplaces, which is marked by a certain manner of talking and making jokes (Ferm et al. 2017). This probably eased the students' relocation of knowledge from school to the workplace and partly explains why the vocational students were keen to fit in and show their social and communication skills in "handling the jargon" in work groups. However, while such skills may enable access to workplace communities, other cultural elements, such as gender, may function as a barrier in the male-dominated industrial sector (Gustavsson and Fogelberg Ericsson 2010). Additionally, female vocational students in the industrial program have experienced such barriers (Ferm et al. 2017), but their experiences have not yet been analyzed.

Changing Conditions for Vocational Learning: From the Perspective of Recontextualization

This chapter provides insight into the school- and workplace-related conditions that enable students' vocational learning in the workplace. These conditions for vocational learning can be understood in terms of tension between the school and workplace contexts and in connection to the different logics and rationalities associated with school-based versus workplace-based knowledge (Schaap et al. 2012). Vocational students are expected to progressively use knowledge from and in different contexts (e.g., school and workplace contexts) and to relocate knowledge in relation to different purposes. The students' vocational learning was not restricted to training in specific skills; it also entailed knowledge about activities, roles, and social practices and vocational identity formation (cf. Evans and Guile 2012). Workplace-based pedagogics, such as different forms of guided learning (coaching, questioning) as part of everyday work, created conditions that supported the students' vocational learning (Billett 2000) as they engaged in progressively more demanding tasks. Despite differences between school- and workplace-based learning, both forms of learning and the conditions in the different contexts were geared toward a clearly defined vocational labor market in the industrial sector. To some extent, these different learning conditions reinforced each other. Such similarities can provide an explanation of why knowledge gained in the school context functioned as a "springboard" for continued learning in the workplace.

Nevertheless, the focus in previous educational research has mainly been on the school as a learning environment and how students are formed there. Pedagogical challenges in vocational education include how to develop and consolidate

knowledge in everyday work activities. This challenge raises questions regarding how workplace-based learning works and how educational institutions reach their goals and emphasizes that students' workplace-based learning should be visible. This mirrors a shift in the transfer concept, which was historically considered a one-way transfer of knowledge from school to work (Akkerman and Bakker 2012), and in the perspective regarding vocational knowledge and the knowledge needed in the ever-changing work life (Raelin 2008).

The theoretical concept of recontextualization directs our attention to how changes occur when different traditions of knowledge intersect (Evans et al. 2010). These intersections may create a basis for innovations that ultimately transgress existing opportunities for vocational learning. From this perspective, the implications of this study may also be discussed in terms of potential changes in practices for vocational learning in the context of vocational education.

First, the dynamic nature of vocational learning can be attributed to personal agency and linked to students' roles as *brokers* as they move between different contexts of learning. The ways in which students recontextualize – bring about and bring along knowledge from one context to another and back again (Evans et al. 2010) – may form the basis for hybrid learning practices (Linell and Persson Thunqvist 2003). In this respect, the students' learning activities are both shaped by everyday work and influenced by neighboring practices of (at least) two different kinds, which in turn challenge the conditions for vocational learning: first, through educational practices, e.g., workshops in school, which are similar in some sense, so students can relocate knowledge from school to the workplace context when putting knowledge to use, and, second, through biographical practices that are near at hand because of students' individual experiences (e.g., personal interests in technology in everyday life) or because of students' *common* experiences with vocational education for developing self-knowledge, which may promote a greater understanding of industrial work. In this sense, the students' social background also may facilitate their participation as newcomers at workplaces as they are already somewhat familiar with informal elements of the industrial culture because their parents or relatives work in the industrial sector.

Second, the presence of students in workplaces may also influence and transform practices in everyday work. Students' engagement and motivation to learn and their position as upper secondary school students impose certain expectations regarding learning and pedagogy and challenge conditions in the workplace. In interacting with students, co-workers are expected to act responsible and to function as informal supervisors. The informal culture in industrial work may therefore change in the presence of students who consistently ask questions as part of their vocational learning. Making workplace-based learning a regular feature of everyday work in companies may contribute to continuous opportunities for learning among the students' co-workers. As indicated in the analysis, the schools' preparedness to take the obligations associated with vocational students' learning differed for various reasons among companies. Some companies had made it a habit to provide workplace-based learning for vocational students. As co-workers occasionally took on the role of informal supervisors in their interactions with

students, they had to articulate tacit vocational knowledge and explain and sometimes justify work routines and procedures. In addition, co-workers introduced students to new technologies and taught them how to operate machines that are not used in school workshops. According to the students, most of the companies that participated in the study expressed mainly positive experiences with workplace learning not only in terms of securing skill provisions but also because the daily interactions between "old-timers" and students stimulated the learning environment of the workplace.

Third, and finally, conditions for vocational learning in upper secondary school vocational education programs are circumscribed by the ways in which disciplinary and work-based knowledge are being defined and recontextualized in the programs' curricula (Evans et al. 2010). The meaning of work-based knowledge, which derives its purpose from the context of employment (Evans and Guile 2012, pp. 114–115), changes when this concept is reformulated in the school curriculum within the framework of workplace-based learning in the school context. As discussed in the introduction section, the educational authorities in Sweden primarily set standards for workplace-based learning, and a strong focus is placed on the organizational arrangements and quality assurance framework for such learning. This framework is different from the nature and logics of workplace learning in everyday work. However, there are commonalities and overlaps between the concepts of workplace-based learning and workplace learning in some substantive areas (Evans et al. 2011).

The curriculum for vocational educational programs, including workplace-based learning, is partly the result of negotiations and compromises between the educational authorities and labor market organizations involved in the field of vocational education (Virolainen and Persson Thunqvist 2017). Therefore, the curriculum is also connected to the context of employment; it is based on the knowledge, skills, and methods common to an occupational group. In that sense, the national curriculum determines what a qualified worker needs to know to be considered employable in a certain field, and it is not company specific. In the Nordic context, such national regulations are historically associated with "the skilled worker concept," in which national certificates in vocational education play an important role in distinguishing unskilled work from skilled work. However, since the labor market partners only have an advisory role in the Swedish vocational education system, the state and educational authorities take a strong stance on the formulation of the curriculum and in defining how vocational learning in workplaces should be organized and linked to school-based vocational learning and general education.

Conclusions

The research underpinning the present chapter has responded to challenges to improve workplace-based learning in vocational education and to relate different forms of knowledge and learning by bridging the gaps between the school context and the workplace context. At the national policy level, as demonstrated,

workplace-based learning is being recontextualized to fit a pedagogical context tailored to meet the institutional goals of vocational education. When implemented in practice within local schools and industries, it is particularly interesting to note how changed conditions for students' vocational learning emerge within the field of tension between the "education-based" version and the "employment-based" version of workplace-based learning.

The concept of recontextualization (Evans and Guile 2012) has contributed to uncovering the dynamic conditions that enable students' vocational learning as they bring knowledge from the school context to the workplace context and back. The school-related conditions prepare the students for entrance into the workplaces, while workplace-related conditions provide students with the opportunity to obtain specific industrial knowledge and to engage in interactions in the workplace. The students' ways of making sense of workplace-based learning as an extension of their educational program (curriculum) and of putting knowledge to work in the workplaces were intrinsically connected with their identity formation processes, that is, becoming skilled workers. Furthermore, the students themselves used learning strategies to bridge school-based and workplace-based knowledge, thus supporting changes in the workplace cultures. In their interactions with the students, industrial workers had to learn and develop pedagogical strategies and new identities as supervisors, instructors, and role models. The conditions for a successful connection between school-based and workplace-based learning were identified in cases where collaboration between schools and industrial companies was well-established. These examples also demonstrate the emergence of hybrid practices where industrial production sites function as supportive environments for working and learning.

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