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Workplace Learning in Dual Higher Professional Education

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Abstract Workplace learning is considered an effective strategy for the development of vocation, career and professional identity. Dual training programs, in which learning at a vocational school and learning at work in a company are combined, are seen as strong carriers for skill formation processes. In this study we explore workplace learning in dual training programs in Dutch higher professional education. To gain an understanding of these learning environments and processes, a qualitative multiple case study was conducted in seven sectors. The findings show substantial differences in learning environments between and within sectors. However, cooperation between school and practice is minimal in all of the cases. Although students develop personal and job-related competencies that are useful for daily work routines, they acquire hardly any profound theoretical knowledge at the workplace. School fails to direct workplace learning. Given the considerable share of workplace learning in dual training programs, and the demands to higher professional education graduates in terms of being able to solve complex problems and develop new knowledge during their career as reflective practitioners, it is important that these shortcomings are resolved. More promising alternatives for workplace learning environments and questions for further research to improve workplace learning in higher professional education are discussed.

Keywords Workplace learning · Dual training programs · Higher professional education · Learning environment · Case studies · Qualitative research

Introduction

Workplace learning is considered an effective strategy for the development of vocation, career and professional identity (Eraut et al. 1998; Lave and Wenger 1991; Engestrom 2000). Higher education institutions are therefore challenged to develop forms of collaboration with the workplace (Tynjälä et al. 2003), in order to create favourable

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opportunities for workplace learning for their students. In the Netherlands, for example, more traditional lessons are increasingly replaced by practical training and workplace simulations (Zitter and Hoeve 2012); similar to international developments for example in Finland, Australia, the UK, and France, among others (Billett 2009; Lester and Costley 2010; Veillard 2012; Zitter and Hoeve 2012). Dual training programs, in which learning at a vocational school is combined with workplace learning within a job in a company for more than 60 % of the program duration, are seen as strong carriers for skill formation processes. Because learning and working are combined, students are also expected to learn how to adapt to the (changing) demands of work and employment; therefore dual training programmes are also considered to increase students' employability.

Since the 1990s the number of students in Dutch dual training programs in Higher professional education (HPE) colleges has increased significantly. These programs are similar to (paid) apprenticeship programs in secondary vocational education. Dutch HPE colleges are completely free to design their own training programs. The Higher Education and Research Act (2004), however, stipulates that workplace learning within the dual training program be subject to an agreement (contract) between the college, the student, and the company where the student is employed. As employees, students in dual HPE spend much more time at work than do students who gain work experience through internships. Students in internships are generally not paid (or only for expenses) and spend less than 60 % of the program duration at work. Students in dual HPE are therefore expected to be given different tasks and responsibilities at work and to be more responsible for their own learning process. Consequently, they are believed to develop more generic and specific competencies and flexibility (Bailey et al. 2004; Nijhof 2006). Combining learning at school and the workplace is therefore considered to provide a basis for lifelong learning, to enhance transfer from school learning to practice, to improve (job-specific) skill development, and to reinforce academic skills and personal development (Poortman 2007). On the one hand, workplace learning in senior secondary vocational education has been researched for decades in the Netherlands; on the other hand: there is still little empirical knowledge of the design of learning environments and students' learning processes in dual training programs; and of how these learning environments could be improved (Poortman et al. 2012; Zitter and Hoeve 2012; Veillard 2012; Schaap et al. 2012). In addition, the optimism about the impact of workplace learning is challenged by empirical evidence (cf. Akkerman and Bakker 2012; Poortman et al. 2012; Nijhof and Nieuwenhuis 2008; Bailey et al. 2004; Gruber et al. 2008).

Academic skills are not always reinforced, for example, and although occupational skills are developed in many situations, this is not automatically the case. Studies show a lack of connection between what is actually learned and what is required of competent professionals in an increasingly complex world (Zitter and Hoeve 2012; Schaap et al. 2012). Furthermore, although there is a very substantial role for the higher education sector in workplace learning and workforce development, studies on the impact of workplace learning in *higher education* is still fairly limited (Lester and Costley 2010). This leads to the question of whether the learning environment in these programs is in fact effective.

In the first part of a study into Dutch dual training programs in HPE, therefore, a survey into learning environment characteristics, personality characteristics and competence development was administered to third-year students of all HPE sectors (Nijhof and Poortman 2013; Reenalda 2011[1]). The survey mainly focused on the differences between internship programs and dual training programs, also in relation to competence development. Both internship students and dual training students progressed regarding competence development in general. They both perceived their competence development as 'satisfactory' for their start at the labour market and for further competence development in their job. Dual training program students appear more successful than internship program students in the short term: they find a job more quickly and are paid a higher salary (Reenalda 2011). Dual training program students, however, also appear to fall short with regard to using cognitive competencies in practice, according to the survey. Regarding both types of learning environments, this part of the study showed that 'typical differences' between regular internship programs and dual training programs were mostly confirmed. For example: students in dual training programs are more productive and independent from the start of their program, and indeed spend much more time at the workplace. Internship students typically gain experience in more than one department and in more companies than dual training students. However, the connection and cooperation between school and work was reported as 'poor' by the students, especially for dual training programs. As stated, both types of students perceived their competence development as 'satisfactory'. However, if secondary VET needs to 'deliver reflective practitioners, who are able to solve complex problems and have the ability to acquire and develop new knowledge during their career' (Schaap et al. 2012), this applies even more to HPE students (Billett 2009; Tynjälä et al. 2003). Only then they will be able to meet the requirements of an increasingly innovative and (internationally) competitive environment.

Therefore, to gain a greater understanding of dual training learning environments and the connection between school and work, these should be studied in more detail (Tynjälä et al. 2003). This is important to better understand what learning opportunities are available (Veillard 2012).

This leads to the following research question:

What are the characteristics of the learning environment and related workplace learning in dual training programs in higher professional education?

We next present the research framework and methodology for studying characteristics of the learning environment and related workplace learning. Consequently, the empirical findings are presented, followed by conclusions

[1] This part of the study using a longitudinal survey design is reported in Reenalda (2011): Effecten van dualisering in het HBO [The effects of work-study programs in Higher Professional Education]. Enschede: University of Twente; and Nijhof, W.J. & C. Poortman (2013). Work-study Programs for the Formation of Professional Skills. In: Beck, K. & Zlatkin-Troitschanskaia, O. (eds). From Diagnostics to Learning Success. Proceedings in Vocational Education and Training. (pp. 157–169). Rotterdam/ Boston/Taipei. Sense Publishers.

regarding the learning environment, workplace learning, and the expectations to workplace learning in HPE as also elaborated in the introduction. In addition, we discuss implications for practice and further research for workplace learning in HPE.

Research Framework

Workplace Learning Environment Characteristics

According to Illeris (2002, p. 24) learning is any process that in living organisms leads to permanent capacity change and which is not solely due to biological maturation or ageing. In this study we consider learning taking place within dual Higher professional education. In dual HPE, students spend most of the program time at their workplace. While an ongoing discussion in vocational education is how students can be supported in making successful transitions from school to work (Akkerman and Bakker 2012), the solution to this problem in dual training appears to be a reduction of the school component. However, although a relatively large workplace component may raise the expectation that students are better prepared for their (future) working life, a reduction of the school component in itself does not solve the problem of a lack of connection between school and work, or theory and practice. Even in dual training, both school and the workplace are part of the learning environment. This means that both school and workplace, and their alignment with each other, are relevant to the learning process (Akkerman and Bakker 2012; Poortman et al. 2011).

The main elements to describe the learning environment are therefore the school's training program characteristics, the workplace characteristics and the alignment between school and workplace. Regarding training program characteristics, the school's curriculum in relation to the workplace component is included (Poortman 2007). Curriculum refers to the plan for providing sets of learning opportunities for the students (Saylor et al. 1981). A more broad indication of learning opportunities regarding curriculum, is the time schedule of the dual training program: for example, students working 3 days a week and going to school for the remaining 2 days or students working an entire year with only two or three school days planned within that period. We also include the type of agreement for the dual training program, because this is one of the elements that characterizes dual training programs. Regarding the workplace context, we include team and department, and students' jobs and tasks in the research model (see also Zitter and Hoeve 2012). Based on Blokhuis et al. 2002 and Blokhuis 2006, we further include the following characteristics of the workplace learning environment: location, mode, instruction, content and sequence (see also Billett 2009; Zitter and Hoeve 2012). Location refers to whether students learn off or on the job, whether the workplace is real or simulated, and whether workplace learning takes place in one or in several departments or companies. Mode refers to the way of learning: individually or in a team; formal or informal; is learning emphasised or is working emphasised and are students expected to be employable from the start? Instruction refers to the question whether showing or discovering is stressed, and whether students are more directed at the work placed or whether conditions are created for them to develop their skills. Content refers to the extent in which learning is subject

to planned learning content and to what extent single, limited tasks or more integrated competencies are being worked on. Sequence refers to the order of the learning activities: is the work structure related to the goals and objectives in the dual training program or is learning related to the work as it normally takes place in the company? Students might start with straightforward tasks or they might be engaged in complex work activities right away. These characteristics were confirmed as relevant in the survey preceding this case study (Nijhof and Poortman 2013). Further curriculum aspects related to the dual training program, explicitly concerning the alignment between school and work, are the methods and material that are intended to direct student learning (Nijhof 1993) at work (Poortman 2007). These aspects are thus part of the alignment between school and work and more specifically concern: guidance and support (see also Billett 2009), assessment, cooperation, and assignments. An overview and more extensive description of these learning environment characteristics is given in Table 1.

Particular alternatives of learning environment characteristics as described here do not necessarily imply a more effective learning environment than other alternatives. The quality of learning and its outcomes, however, are expected to be determined by the way in which these alternatives are combined and fulfilled. When a student needs to learn how to work with very expensive and sensitive equipment, for example, 'discovering' might not be the most appropriate type of instruction, and 'showing' is more adequate at least in the beginning. In a nursing home with psychogeriatric residents who often also suffer from physical disorders, students may start with more straightforward ('sequence') and single tasks ('content'), such as helping residents to put on support stockings, cleaning up and preparing breakfast, rather than more complex and integrated tasks such as personal basic care and administering medicine. This means that the realization of these characteristics and related options need to be described in context.

Social Interaction and Competence Development

According to Illeris (2002), impulses for the student's learning process result from social interaction between the learner and the learning environment. In addition to the workplace learning environment characteristics, therefore, the characteristics of the learner, in this case HPE students, and social interaction processes are relevant for workplace learning. We therefore included the influence of student characteristics on learning in terms of age, motivation for the program and prior experience (Blokhuis 2006; Nijman 2004; Poortman 2007) in the research framework. In addition, we made use of the 'social interaction' categories as defined by Illeris (2002) and elaborated by Poortman (2007) to describe students' workplace learning. This concerns direct social interaction with teachers, peers, colleagues or the workplace mentor as well as indirect social interaction through media, such as books or the internet. To categorise and further define these interactions, Illeris (2002) has labelled six main types: perception, transmission, experience, imitation, activity and participation. Poortman (2007; Poortman et al. 2011) has identified the type of activity, role of others and extent of initiative and activity of the learner within each type, to make a more concrete distinction. In the case of perception, the learner may be registering information in a more or less passive way, perhaps by observing, or hearing colleagues talking nearby.

Table 1 Learning environment characteristics

Characteristic	Description	Options
Training programme: Curriculum	Goals, structure and content of dual training programme	i.e. amount of workplace learning, type of contract
Workplace context	Organisation and culture at workplace	i.e. team and department, students' tasks
Work-study programme and workplace:		
Location	Where does workplace learning take place?	- Real or simulation - One or more departments/companies - On or off-the job
Mode	Way of learning	- Individually/team - Formal/informal - Employable from start/later - Emphasis on learning/working
Instruction	Type of instruction	- Showing/discovering - Directing/creating conditions
Content	Structure of learning content	- Planned/guidelines - Single tasks/integrated competencies
Sequence	Order of learning activities	- Work structure related to intended competencies/learning related to work at workplace - Start with straightforward/complex tasks
Alignment school-work		
Guidance and support	Progress and feedback	- i.e. contact frequency and intensity
Assessment	Assessment method regarding workplace learning from both school and workplace. Concluding part of learning process with assessment	- Written/verbal; emphasis on theory/practice; national (examination), school- or workplace-specific; with/without relation to competencies
Cooperation	Extent of alignment between school and practice and responsibility for learning process from those involved	- Hardly any/a lot of cooperation and integration; individual responsibility/shared
Workbooks and assign-ments	Learning material applied to direct workplace learning (by school).	i.e. Main assignment, reflection reports, portfolio

When the student is listening more actively, taking notes (from others or from media) or otherwise processing information in a more active way, this is labelled transmission. Experience is applied when the learner is trying out performance under the guidance of a teacher, workplace mentor or a colleague. This person may help the learner with feedback, ranging from instruction and correction to explanation. When the learner is copying activities from the supervising colleague or teacher who is demonstrating the procedure, this is called imitation. When the learner is working independently, with less intensive supervision, this is termed activity. Participation applies when the learner is working autonomously in cooperation with colleagues. The learner's initiative and

activity generally increase with each subsequent interaction category. Competence development is the result of this interaction, which is, in turn, influenced by the characteristics of the learning environment. The research model is shown in Fig. 1.

Methodology

Case Studies

To describe workplace learning environments and the related learning processes in their context, we made use of the qualitative multiple case study methodology (Krathwohl 1998; Yin 1984; Stake 2000). We selected HPE programs with more than 60 % of workplace learning in their curriculum (a workplace learning percentage similar to the percentage within dual training in Dutch secondary vocational education). We selected a total of seven cases, one from each HPE sector, to enable us to describe sector-specific characteristics. Cross-case analysis is intended to lead to more general findings.

For each selected training program, students were asked to participate as respondents. To gain an understanding of workplace learning environments, and related learning, students were selected who had completed or almost completed a particular workplace learning period. These were third-year students. To gain a more complete description and achieve (data) triangulation to promote the validity of the results, students' workplace mentors and school teachers involved in the guidance of

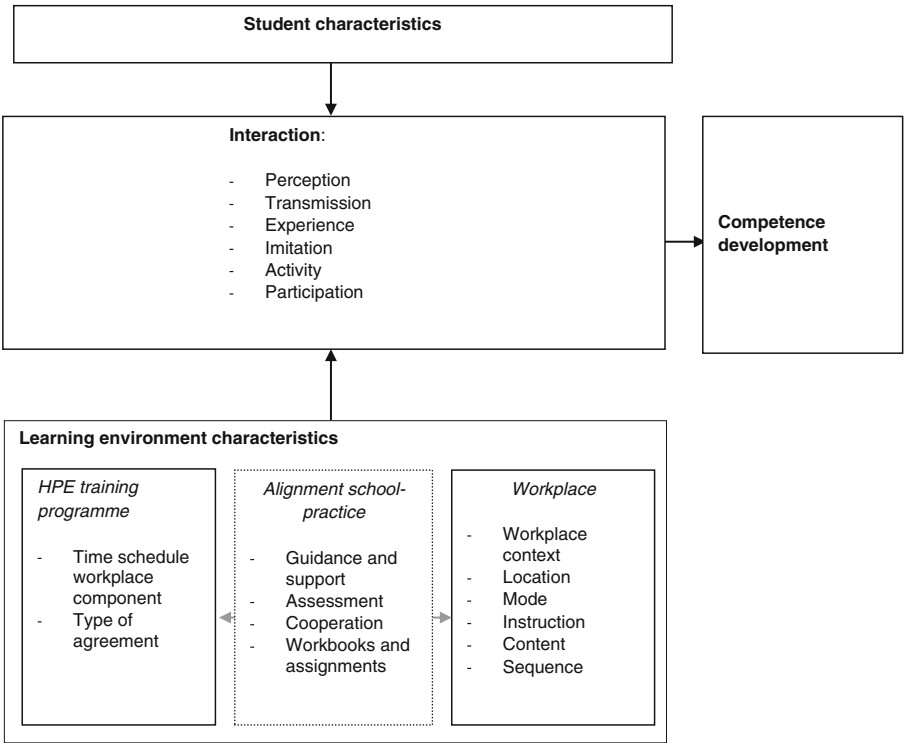

Fig. 1 Research model

workplace learning were also asked to participate. The respondents were selected with the help of college program contact persons. The specific HPE training programs, number of students, teachers and workplace mentors for each case are presented in Table 2.

Instruments and Analysis

In this study data were collected with semi-structured interviews and document analysis (Yin 2003). The research model components (Fig. 1) were used as a framework for the interviews. This means that the interview questions related to student characteristics, learning environment characteristics, learning activities and their outcomes. Regarding competence development, no valid and reliable general assessment applicable for all sectors and students was available to categorise learning outcomes. We therefore used an open question regarding learning outcomes in the interviews and broadly categorised the results in: (theoretical) knowledge and skills learnt at school during the dual training program, and practical/workplace knowledge and skills learnt at the workplace, including personal development. Documents regarding, for example, the course and examination regulations, mentor guidelines and students' workbooks were studied to gain background information about the formal guidelines in the training programs regarding the curriculum and the workplace learning component, such as the number of hours per program, intended learning content and the role of assignments according to the school.

A systematic approach to data collection was taken to promote the reliability of the case study (Poortman and Schildkamp 2011). This concerns firstly the development of an interview schedule to achieve comparability and completeness of the different interviews. Although the subjects and form of the questions were outlined in the schedule, the specific order was dependent on the respondent's answers, to gain as much information as possible, taking into consideration the respondent's experiences. The same procedure was applied to the interviews with mentors and teachers. Secondly, the systematic method of data collection concerned the comparable length of the interviews (between 60 and 90 min) and an audio recording of each interview. To

Table 2 Respondents

Case	Sector	Dual training programme	Students	School teachers	Workplace mentors
			N	N	N
1	Health	Nursing	4	3	5
2	Agriculture	Ecology	5	2	2
3	Business	Business, management and law	4	1	4
4	Technology	Industrial product design	4	4	3
5	Society and human behaviour	HRM	4	1	4
6	Education	Teacher training	4	2	3
7	Language and culture	Journalism	4	4	*

*No workplace mentor because of simulated workplace at school: 'workplace mentor' is school teacher

Table 3 Matrix display example initial single case analysis

Curriculum and workplace component Contract			
	Student 1	Student 2	Student …
Workplace context	Summary on this component according to student, mentor and teacher	Summary on this component according to student, mentor and teacher	Summary on this component according to student, mentor and teacher
…			

make sure that the interview schedule was appropriate, two researchers tested this with the respondents of the Journalism case. Two different interviews were summarised and discussed with two external researchers in order to verify the relation between the data and the research questions. The schedule and data turned out to be satisfactory, which resulted in the Journalism case data collection being included as a case.

To prepare the interview data for analysis, the audio recordings were transcribed verbatim. To analyse the interview results, we developed a coding framework, based on the research model components (Fig. 1). Alignment, for example, was a main code in the framework; 'guidance and support' and 'cooperation', were subcodes. Fragments in the interviews were coded accordingly, using the software program Atlas.ti (4.1). Further analysis was carried out by summarizing and relating the findings with the aid of matrix displays. We firstly summarized the results per student per case (that is a sector, such as Ecology). An example of the related matrix display is given in Table 3. Secondly we summarized the results for all of the students per case. Consequently, multiple case analysis took place by comparing the single-case displays in one overall display, as presented in Tables 4 and 5.

To enhance the reliability of the findings, check-coding took place before the actual coding of the data. Definitive coding took place once inter-rater reliability was more than 80 %.[2]

Results

We describe the findings in terms of the workplace learning environment characteristics, social interaction and competence development as conceptualised in the research framework, with regard of the differences between sectors.

Student Characteristics

Dual training students are generally between 20 and 22 years old, except in the Ecology case. This is the only part-time dual training program, where generally older students already had a paid job before they started the training program. All students are in their third year and have (nearly) finished the workplace learning period in their program.

[2] Five randomly selected pages of quotations were used to calculate the proportion of agreement.

Table 4 Findings regarding curriculum and location by training program

	Nursing	Ecology	Business, management and law	Industrial product design	HRM	Teacher training	Journalism
Curriculum and work-place compo-nent	In third year, 4 weeks of working alternated with 1 week of school during entire school year	Students work full-time during entire programme; alter-nate with 1 day and night of school ev-ery other week	Students work at least 32 h/week for 6 months in third year. One reflection day at school in conclusion	Students have to work 100 days in third year. After 10 weeks 1 reflection day at school	Students alternate 3 days work/week with 1 after-noon of school in third year	Students start with 2 days work/week and 2 re-flection days at school; then 3 days of work/week with 1 re-flection day in third year	Simulation. Students alternate 4 days of practice with 1 day of school per week for a half year in third year
Contract	Formal agreement and remuneration; school does not sign	Fully paid job with formal agreement; school does not sign	Training-employment contract, signed by school and workplace; also an employment contract and salary—copy for school	Agreement and remuneration; school does not sign	Training-employment contract and remuneration, signed by school and workplace	Internship without contract or remuneration. General agreement school-workplace	No agreement/ contract
Workplace context	Hospital. Students provide personal basic care to patients. Department, team, schedule differ for students	Ecology department of local authority; students have own specialism	Company, team and activities differ for students	Company and team differ for students. Workplace formulates specific assignment for workplace learning period	Company, team and activities differ.	Primary schools: both regular and special. Different levels. Students prepare lessons and teach these to pupils	Same for all students, because of simulated (editor) environment. Students function as editor, gather news/information and write articles
Location	- Real workplace - Job rotation, depending on start dept. - On-the-job	- Real workplace - One department - On-the-job	- Real workplace - One department - On-the-job	- Real workplace - One department - On-the-job	- Real workplace - One department - On-the-job	- Real workplace - One department - On-the-job	- Simulation - Variation in role within editorial - Department

Table 5 Findings regarding mode and instruction by training program

	Nursing	Ecology	Business, management and law	Industrial product design	HRM	Teacher training	Journalism
Mode	*School:* Individual and group *Workplace:* - Team - Productive from start - Informal - Emphasis on working	*School:* Group *Workplace:* - Individual - Productive from start - Informal - Emphasis on working	*School:* Group *Workplace:* - Team - Introduction phase - Formal and Informal - Emphasis on working	*School:* Group *Workplace:* - Individual - Introduction phase - Mostly informal - Emphasis on working with room for school assignments	*School:* Group *Workplace:* - Mostly together with mentor - Productive from start, sometimes after short introduction period - Informal - Emphasis on working	*School:* Group *Workplace:* - Together with mentor and colleagues - Gradually but quickly more productive - Informal - Emphasis on working	*School:* Group *Workplace:* - Individual writing, products as a team - Productive from start - Formal and informal - Emphasis on learning content
Instruction	- Showing - Creating conditions (more directing in case of unsatisfactory performance)	- Discovering - Creating conditions	- Discovering - Creating conditions	- Discovering - Directing regarding guidelines; creating conditions regarding execution of tasks	- Discovering - Often directing, sometimes creating conditions	- Showing at start, further on more discovering - Content: directing, approach: creating conditions	- Discovering, directing in the background - Creating conditions with regard for guidelines
Content	- Planned in advance - Integrated	- Guidelines - Integrated	- Guidelines - Integrated	- Guidelines - Integrated	- Partly planned in advance - Integrated	- Planned in advance - Integrated	- Guidelines - Integrated
Sequence			- Learning related to		- Learning related to work as	- Learning related to	- Learning related to work as encountered at workplace

Table 5 (continued)

Nursing	Ecology	Business, management and law	Industrial product design	HRM	Teacher training	Journalism
- Dependent on dept., related to intended competencies - From straightforward to complex, dependent on dept.	- Learning related to work as encountered at workplace - From straightforward to complex, dependent on students' prior experience	work as encountered at workplace - straightforward	- Learning related to work as encountered at workplace - Straightforward, dependent on tasks	encountered at workplace - straightforward	work as encountered at workplace - straightforward	*and* related to intended competencies - straightforward and complex, dependent on role

Dual training students generally want to work rather than 'be in the books'. They want to *do*, are generally more independent than students in internship programs and take more initiative. School is generally a 'side issue'. Where apparent, the relation of particular student characteristics, such as prior experience, with the way in which learning environment characteristics are realized, is described below.

Curriculum, Type of Contract, Workplace Context and Location

The results show that workplace learning within HPE is designed and implemented very differently in each case. All programs, however, basically consist of 4 years (6,400 h), with the first 2 years intended as a basis—in part theoretical. The third year commonly serves to develop practical experience. Table 4 shows in more detail how the different workplace learning environment components regarding curriculum, contract, work context and location can be described by program. An example of differences in the practice component is the fact that Nursing students work the entire year and have lessons at school every 4 weeks, while Business, Management and Law students work full-time for 6 months, and finish this period with a day of reflection at school. Different types of contracts or agreements with the training company are used in different sectors. In Ecology, for example, students have a fully paid job with a formal agreement with their workplace; however, school does not sign the agreement. In the HRM case, the agreement consists of a training-employment contract and is signed both by school and the workplace. In most of the cases, however, school has little awareness of any agreements.

Workplace contexts vary between and within sectors. To an extent students in Nursing, Teacher Training and Journalism carry out comparable tasks in their respective sectors. In the other training programs, work activities greatly depend on the particular department and/or student. A range of very different workplaces are used as training places for students. Teacher training students, for example, do not work only at regular primary schools, but also at different levels or in special education. Special education is, however, very different from regular education in terms of, for example, work pressure, communication with pupils and communication with colleagues. Nursing students may work in the surgical department of a hospital, as well as in a range of other departments, of greater or lesser complexity. This may have a strong impact on pressure of work. In a large surgical department, for example, '*it's pretty hard*' according to one of the students, while in a small specialised department, such as urology, the atmosphere is better and colleagues are much more involved in the students' learning process. Team composition also varies among and within sectors. Only in the Journalism case there is one type of team for all students. Their workplace is simulated and students function as an editor, gathering news and writing articles. In the other cases, size, social atmosphere and communication and support of colleagues to students vary. A Nursing student reports, for example, that her team's colleagues differed in work approach, which made her very insecure.

Students mostly work on the job in a real workplace, except in Journalism. And except in Nursing, students are supposed to stay in one department or company as intended by the school. Although the Nursing college aims to have students start at another department at the beginning of each new school year, the workplace is the decisive factor. One of the Nursing students remained in the same department for 18 months, because she was first required to prove her mastery of the higher education level of competency: '*after*

18 months you haven't got any further; it's much too long', one of the teachers comments. Two Industrial Product Design students, however, acted on their own initiative and took a look around other departments too. Therefore, student characteristics such as taking initiative may influence variation in workplace learning opportunities.

Mode

The results regarding mode of learning, instruction, content and sequence are presented by program in Table 5. Only in programs where a main assignment has to be completed does training program content have any influence on workplace learning. This is the case in Industrial Product Design. In Ecology, assignments are integrated with workplace learning, whereas in Journalism, school provides the framework for workplace learning. In the other cases the emphasis is on working rather than formal learning: '*they just expect you to participate in the work for 100 %*'. Students are usually expected to be productive from the start and need to use their initiative for their own learning process. They are barely given an introduction to their workplace. They often work on assignments (individually) after working hours or at home, which impedes integration between school and practice. Learning takes place focused on practice only. There is hardly any support for theory or the development of background knowledge (cf. Van Bommel et al. 2012). Some students participate in formal training at work, for example to learn about a software program (Industrial Product Design). In the Journalism case, students participate in meetings where theory related to the current work content is discussed.

Cooperation with others is important both at work and at school. At school, this relates to meetings, sometimes for reflection, with fellow students. At work, cooperation with colleagues and other students is very important. In Industrial Product Design, students also work individually, while in Education and HRM, close cooperation with the workplace mentor is common.

Instruction, Content and Sequence

The school aims to determine beforehand which activities students should carry out in order to develop the intended competencies in Nursing, Teacher Training and HRM. However, especially in Nursing and Teacher Training, students find it difficult to combine work and learning, because their workplace is focused on daily work processes. In general, work processes in the cases do not correspond with the intended learning content. The workplace is the decisive factor in terms of content. Students are largely responsible for directing their own learning process. Both school and work expect students to use their initiative when they need theoretical or other support. The extent of independence of students and their prior experience may be of much influence; however, also the students who are known to be better at school and/or more motivated than others, need guidance from teachers and workplace mentors to support their learning and help them to complete assignments and the workplace component as a whole. Dual training program students in particular may experience conflicts of interests while combining work, school and the home situation,[3] and may

[3] Because these students generally consists of older students with more (family) responsibilities than internship students.

therefore appreciate more intensive direction. Only the students in Ecology (who are generally older and more experienced) feel that they do not need such guidance. Many students would also appreciate a clearer structure of content at school and the opportunity to develop more theoretical knowledge there: '*The lessons were very short, they seemed to want to get it over with quickly*'. School is more concerned with 'coaching' than with knowledge transfer, and students do not always want the curriculum to be entirely demand-led. Students are not always able to relate the basic knowledge acquired in the first years of the program to their current work activities, because they no longer have this knowledge readily available: '*As if we would still remember that!*' Reflection, supposedly an important part of most of the programs, is therefore impeded.

Work activities gradually become more complex, depending on the workplace. An exception is that of the older Ecology students, who generally have specific and greater work experience, and also carry out more complex tasks from the beginning of the dual training program. In all cases, more integrated competencies rather than single, limited tasks are worked on.

Alignment

Workplace guidance and support is mainly focused on work processes and activities, rather than on the learning content and reflection as is described in Table 6. Workplace mentors have either not been informed of the school's assignments or guidelines, or they have developed their own way of working, as commented by a workplace mentor: alignment is '*absolutely insufficient…I have no idea what happens there*' (at school). Furthermore, the quality and intensity of guidance varies significantly between and within cases. Only in the Industrial and Product Design case is the students' competence development explicitly discussed. Students do not always work in the vicinity of their mentor, due to, for example, pressure of work or different work schedules. Colleagues may sometimes informally take over the role of mentor. The knowledge and expertise of mentors also varies widely. In Nursing, for example, one mentor was educated at VET level, rather than higher professional education level; another was still a fourth-year student herself. (Incidentally, the students guided by these mentors both dropped out of their dual training program).

Regarding cooperation between school and work, students state that they can always ask their mentors questions; they tend not to consult with both mentor and teacher, however. Teachers rarely visit the workplace, as one of the students comments: '*school has no idea what I do here*'. Communication between teachers, workplace mentors and students generally only takes place when the student has problems at work. Usually guidance intensification is overdue in this case, and does not prevent students dropping out or finishing the period with an unsatisfactory grade. Although students feel that they are an employee rather than a student during their dual training program, they would appreciate more guidance from the school. Only the Ecology students, who are older and have more prior experience, do not feel this need. In the Industrial Product Design case, teachers and mentors meet twice during each workplace learning period, to discuss the students' progress in relation to competence development.

In Teacher Training and Nursing in particular, assignments are intended (by the school) to be a central feature. Students need to find opportunities at work to complete these. However, due to pressure of work this is difficult, and students become

Table 6 Findings regarding alignment by training program

Alignment	Nursing	Ecology	Business, management and law	Industrial product design	HRM	Teacher training	Journalism
Guidance and support	Intensity of guidance by school mentors dependent on progress; low intensity by mentor and role model or colleagues, except in case of unsatisfactory progress	Usually 1 workplace mentor, intensity dependent on workplace; hardly any guidance by teacher or coordinator from school	Usually 1 mentor, intensity dependent on workplace; hardly any guidance from school	Usually 1 mentor, colleagues also guide student, intensity dependent on workplace; hardly guidance from school coordinator or teacher, except during reflection sessions.	Intensive guidance from workplace mentor; during workplace period hardly any contact with school	A mentor and a coach; contact with mentor intensive; hardly any contact with coach; intensity of contact with coach and reflection teacher from school dependent on student	Teacher guides students individually and in groups; dependent on time schedule teacher
Workbooks, assignments and assessment[a]	Several workbooks, assignments and reports. Workplace assesses student according to learning plan, assignments and skills	Competency descriptions intranet; assignments, learning goals related to competencies and report. Assessment dependent on mentor.	Guidelines, assignments from workplace; main assignment and report; competency checklist. Assessment by workplace based on students' and role models' (self-)assessment, competency checklist, report and sometimes job evaluation	Guidelines, website, assignment format; main assignment, several reflection assignments and monthly reports, main report and portfolio. Teacher assesses workplace learning in cooperation with students' role model, based on criteria.	Guidelines and task booklet, learning plan, assignments, reflection report and portfolio. Student is supposed to submit feedback form from workplace to school every 2 months; no verification.	Assignment book, research assignment, portfolio, care record. Dependent on mentor, assessment takes place based on school's competency criteria; school and work partly assess the student in cooperation	Guidelines, portfolio, learning process reports, assignments. One assessor, based on criteria
Cooperation	Separate tracks, communication only in case of problems	Separate tracks, communication	Separate tracks, communication only in case of questions	Dependent on teacher; good communication in terms of content and	Separate tracks, reasonable	Mostly separate, except for progress evaluations; reasonable	School and practice are generally

Table 6 (continued)

Alignment	Nursing	Ecology	Business, management and law	Industrial product design	HRM	Teacher training	Journalism
		only in case of problems		assessment criteria, and in case of problems	communication regarding learning tasks and assessment, contact in case of problems	communication regarding assignment content, contact in case of problems and questions	connected well; school communicates with real practice too

[a] Separately from workplace learning, students are assessed based on written tests, skills, attendance, presentations, reports and the like at school

'reflection-weary'. However, the more the school tries to direct workplace learning, the larger the gap between theory and practice seems to become, because students have little opportunity at work to focus on school. In Nursing, for example, opportunities to complete assignments depend on the extent to which assignment content is aligned with the department and type of patients. This is why job rotation between departments might be helpful. In Ecology and HRM, however, school assignments are better aligned with daily work activities, which enables more integration. In Industrial Product Design, the framework of one large assignment, approved by both workplace and school, is also valued. Learning and working focus on one particular larger task.

Assessment is also subject to poor communication. The process, rather than the content and criteria, is discussed. Assessment criteria therefore vary considerably. In some cases coordination at the level of content and assessment criteria (Industrial Product Design, Education and HRM) or intentions to improve communication (Nursing) are good; in practice, however, they are not realised. Teachers assess workplace learning on the basis of the assignments and student reports. Workplace mentors focus mainly on the quality of work performance. This does not usually involve learning goals or competence development.

Social Interaction and Competence Development

The results regarding social interaction and competence development are presented in Table 7. Students usually start by observing more experienced colleagues, listening, and trying out work tasks. Learning activities are therefore generally categorised from 'perception' at the beginning of the workplace learning period, to the more independent processes (i.e. 'activity', 'participation') soon after. Students are generally expected to use their own initiative early in the process. The 'participation' type of social interaction is, in other words, central. Only in Nursing and Teacher Training does 'imitation' also play an important role. Relatively little attention is paid to showing how the work should be carried out, explaining, and sharing knowledge and experiences by mentors and colleagues.

Students mainly progress in terms of personal development. Communication, cooperation and working independently are also reported learning outcomes. In addition, students develop knowledge of work processes in their training companies. They further develop job-specific, rather than theoretical knowledge. The question is therefore whether students are able to transfer their knowledge and skills to other work contexts. Theoretical knowledge taught at school (if at all) does not always connect with students' experience at work and is therefore not sustainable.

Conclusions

The findings show substantial differences in learning environments between and within sectors; for example, the form and duration of workplace learning periods are different. Despite the diversity of the different programs, however, cooperation between school and practice is minimal in *all* of the cases. Although these findings are based on a limited number of cases, they are in line with the results of the preceding survey study. The case study shows what this means more concretely. The control of content in the

Table 7 Findings regarding social interaction and competence development by training program

	Nursing	Ecology	Business, management and law	Industrial product design	HRM	Teacher training	Journalism
Social interaction	- Perception to participation - learning through experience by participation. Development of theoretical knowledge at school to apply at work	- Varies for each student - No 'imitation' - Autonomous, self-directed learning and working, almost as a fully qualified employee (dependent on prior experience)	- Varies for each student - Hardly any 'imitation' - From guidance to self-directed participation	- Perception to more participation, for each assignment - Hardly any 'imitation' - Guided learning from experience to self-directed execution of tasks	- Perception to participation - Hardly any 'imitation' - Weak self-directed learning with deficient knowledge base	- Perception, transmission, to participation - From directed to self-directed learning based on student development plan and portfolio	- Transmission to participation - No 'imitation' - Directed guidance both in team and individually, also self-directed
Competence development	School: theory and skills	School: knowledge of environmental law	School: general theory	School: theory	School: limited amount of theory in third year	School: hardly any profound insight is developed in third year	School: general development
	Work: Skills, professional development, dependent on department; specialised and applied	Work: communication skills, work processes (dependent on prior experience), working independently and goal-oriented	Work: knowledge of organisation, communication and cooperation skills, analytical skills, professional attitude, specific theories (dependent on workplace), integrating theory and practice	Work: vocational knowledge dependent on workplace, integrating theory and practice, professional attitude, communication and team skills, working independently, knowledge of organisation	Work: communication skills, commercial skills, work processes	Work: communication and cooperation skills, independence, partly planning skills, specific theory about special education	Work: working in team of editors, professional attitude, work processes, importance of applying skills in practice

form of assignments is varied and often very weak in execution; the assessment and supervision of students both within and between cases are completely separate between school and work, not standardized and therefore very subjective in the cases studied. The school, in other words, has hardly any influence on the course of events during the students' workplace learning phase. They are often not even involved in signing the contract or agreement for the workplace component. Similar conclusions were found in the nineties by De Vries (1988) and Nieuwenhuis (1991), for Dutch Secondary Vocational Education. Remarkably, such findings also apply almost 20 years later to the case of Higher Professional Education. Student learning in workplaces is often unguided still (Schaap et al. 2012).

The workplace mentor and school teacher should help learners develop their abilities of critical reflection and enquiry, should act as a process consultant, and should help students develop their academic skills as well as apply these in the workplace (Billett 2009; Lester and Costley 2010; Veillard 2012). This goes beyond the workplace learning period itself. Particular curriculum and pedagogic responses are also required in advance of and after students' workplace learning (Billett 2009). Students need to be prepared as 'agentic learners' beforehand, for example (Billett 2009). In addition, expectations about for example purposes, support, and learning goals need to be clarified in advance. The results of the case studies show, however, that students are not always able to relate the basic knowledge acquired in the first years of the program to their current work activities; they certainly do not seem to be 'prepared as agentic learners'. Moreover, afterwards, students should be supported in reflecting on the links between theory and practice (Billett 2009; Lester and Costley 2010; Poortman et al. 2011; Schaap et al. 2012; Veillard 2012).

The survey part of the study already showed a poor connection between school and work for dual training students. On the other hand: both types of students perceived their competence development as 'satisfactory' according to the survey. However, if secondary VET needs to 'deliver reflective practitioners, able to solve complex problems and to acquire and develop new knowledge during their career' this applies even more to HPE students (Billett 2009; Tynjälä et al. 2003). In addition, dual training program students appeared to fall short with regard to using cognitive competencies in practice according to the survey. The case studies appear to support this finding. While 'participation' in the cases is central as a social interaction process, the question is whether students are able to move beyond the level of merely carrying out work activities to reach the level of higher professional education reflection and competence development. Students may appear to develop the competencies required for the (current) job, however, do they develop sufficient underlying, transferrable theoretical professional knowledge in order to become the flexible knowledge worker that companies nowadays need? The expectation that the workplace as part of the program is an effective form of training, which enables students to develop into successful professionals in the long term, would appear to be an illusion.

Although these findings are not surprising considering studies with comparable findings at the level of senior secondary vocational education, the problem of developing workplace learning environments without a theoretically sound foundation or input from evidence-based research is persistent (Poortman et al. 2012). Given the considerable share of workplace learning in vocational education also at the higher professional level, resolving these shortcomings is very important. The ambitions for

combining work and (parttime) HPE training are high (ResearchNed 2012). The need for both participants and employers for flexible, specified training has increased in recent years and expectations are higher, still requiring, among other things, an excellent connection of the educational program to the learning possibilities at the students' workplace.

Implications for Practice

Despite the apparent challenges for designing effective workplace learning, a combination of school-based learning and work-related learning is still considered better than learning in school alone (Schaap et al. 2012). In this respect, the 'connective model' as suggested by Guile and Griffiths (2003) appears to be a more constructive model for relating school and workplace learning. Guile and Griffiths (2003) argue that learning through work experience involves mediating the relationship between the different kinds of knowledge and experience developed in school and work (i.e. theoretical and every-day). In relation to the curriculum, theoretical knowledge should not be treated as a 'series of generalisations arising from empirical data'—in other words, a combination of 'transmission' and 'experience'. However, students should be supported in discovering the essential connection between individual experiences, related to an object of their study, and in reflecting on the implications of changes in those experiences. This can only occur in a context where the workplace and the school have developed a shared understanding of their respective roles in assisting learners to 'develop as boundary crossers' (see also Akkerman and Bakker 2012). The findings have shown that communication between school and work is not intensive and generally reported as ineffective in the cases studied. Considering the skill level expected of HPE graduates in the knowledge economy—the requirements of an increasingly innovative and competitive environment—a more connective model of learning and a more cooperative relationship between school and practice are meaningful considerations to attain more effective dual HPE (see also Billett 2009; cf. Kessels and Kwakman 2007). To achieve more effective training programs, the coordination of supervision, content, learning process guidance, transfer of theoretical knowledge and assessment should be addressed. Workplace and school mentors need to cooperate more closely, for example, and to discuss assessment criteria and procedures more explicitly (cf. Kessels and Kwakman 2007).

While workplace learning has been researched for decades, the challenge has been to apply the related findings into workplace learning in practice. However, in recent years studies with indications of more fruitful designs of workplace learning have become available, both in the Netherlands and internationally (Poortman et al. 2012; Veillard 2012). Making use of simulations, hybrid learning environments, and/or 'learning in the region' are promising ideas in this respect (Zitter and Hoeve 2012; Nieuwenhuis et al. 2014; Meijers and Kuijpers 2007). The concept of hybrid learning environments has been developed in close participation with higher (vocational) education. Hybrid learning environments cross the traditional school boundaries into working life and concern settings in which learning and working are integrated and merged. Examples of hybrid learning environments are in-school companies where students work on real-world products and problems for customers (Zitter and Hoeve 2012), for example an in-school bakery, or a printing company. Another option is a special learning department in a

company or institution, where students combine learning and working serving real customers or patients, and teachers are available for guidance and support as well as workplace mentors; such as a learning department in a nursing home (Nieuwenhuis et al. 2014). Such designs may have a more real possibility of helping students to develop abilities of critical reflection, helping students develop practical as well as academic skills, and connecting learning goals to workplace activities, because the workplace and the school are *merged*; teachers and workplace mentors *are available at the same location*, students work on *real tasks for real customers and are at the same time guided* by workplace mentors and school teachers.

Research Implications

Different schools and workplaces have developed their own method of working in the context of dual higher professional education, with no clear underlying line of reasoning related to the promotion of learning processes and competence development. However, for many years, descriptive and theoretical research into workplace learning has been prevalent (Poortman et al. 2012). Many discussions about how the workplace and education could be better integrated dominate the literature about workplace learning. Recently developed initiatives for integrating and merging school and workplace to support workplace learning might help to overcome these challenges. Further design research related to these initiatives and empirical research into the effects of newly developed forms of workplace learning is therefore recommendable.

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References

Akkerman, S. F., & Bakker, A. (2012). Crossing boundaries between school and work during apprenticeships. *Vocations and Learning, 5*, 153–173.

Bailey, T. R., Hughes, K. L., & Moore, D. T. (2004). *Working knowledge. Work-based learning and education reform*. New York and London: RoutledgeFalmer.

Billett, S. (2009). Realising the educational worth of integrating work experiences in higher education. *Studies in Higher Education, 34*(7), 827–843.

Blokhuis, F. T. L. (2006). *Evidence-based design of workplace learning*. Enschede: Universiteit Twente. Dissertation.

Blokhuis, F. T. L., Jellema, M., & Nijhof, W. J. (2002). *De kwaliteit van de beroepspraktijkvorming: Een onderzoek naar praktijken en ervaringen met de beroepspraktijkvorming bij ROC Eindhoven*. Enschede: Universiteit Twente.

De Vries, B. (1988). *Het leven en de leer*. Nijmegen: Instituut voor Toegepaste Sociale Wetenschappen.

Engestrom, Y. (2000). Activity theory as a framework for analyzing and redesigning work. *Ergonomics, 43*(7), 960–974.

Eraut, M., Alderton, J., Cole, G., & Senker, P. (1998). *Development of knowledge and skills in employment*. Brighton: University of Sussex Institute of Education.

Gruber, H., Harteis, C., & Rehrl, M. (2008). Vocational and professional learning: Skill formation between formal and informal learning. In K. U. Mayer & H. Solga (Eds.), *Skill formation; Interdisciplinary and cross-national comparisons*. New York: Cambridge University Press.

Guile, D., & Griffiths, T. (2003). A connective model of learning: the implications for work process knowledge. *European Educational Research Journal, 2*(1), 56–73.

Illeris, K. (2002). *The three dimensions of learning*. Frederiksberg: Roskilde University Press.
Kessels, J., & Kwakman, K. (2007). Interface: establishing knowledge networks between higher vocational education and business. *Higher Education, 54*, 689–703.
Krathwohl, D. R. (1998). *Methods of educational and social science research: An integrated approach*. New York: Longman.
Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge: Cambridge University Press.
Lester, S., & Costley, C. (2010). Work-based learning at higher education level: value, practice and critique. *Studies in Higher Education, 35*(5), 561–575.
Meijers, F., & Kuijpers, M. (2007). *Vakbekwaam door simulaties? Een onderzoek naar simulaties in de mbo-opleiding 'Boekhoudkundig medewerker' [Competent through simulations? A study into simulations in the VET-accountant training program]*. Amersfoort: ECABO.
Nieuwenhuis, A. F. M. (1991). *Complexe leerplaatsen in school en bedrijf*. Groningen: RuG/RION.
Nieuwenhuis, A. F. M., Poortman, C. L., & Reenalda, M. (2014). Nieuwe concepten voor het vormgeven van werkplekleren [New concepts for designing workplace learning]. *Pedagogische Studiën, 91*(1), 39–53.
Nijhof, W. J. (1993). Inleiding en rationale. In W. J. Nijhof, H. A. M. Franssen, W. T. J. G. Hoeben, & R. G. M. Wolbert (Eds.), *Handboek curriculum. Modellen, theorieën, technologieën* (pp. 13–31). Lisse: Swets & Zeitlinger.
Nijhof, W. J. (2006). *Het leerpotentieel van de Werkplek. Farewell speech University of Twente*. Enschede: University of Twente.
Nijhof, W. J., & Nieuwenhuis, A. F. M. (2008). *The learning potential of the workplace*. Rotterdam: Sense Publishers.
Nijhof, W. J., & Poortman, C. (2013). Work-study Programs for the Formation of Professional Skills. In K. Beck & O. Zlatkin-Troitschanskaia (Eds.), *From diagnostics to learning success. Proceedings in Vocational Education and Training* (pp. 157–169). Rotterdam/ Boston/Taipei: Sense Publishers.
Nijman, D. J. J. M. (2004). *Supporting transfer of training: Effects of the supervisor*. Enschede: University of Twente. Dissertation.
Poortman, C. L. (2007). *Workplace learning processes in senior secondary vocational education and training*. Enschede: University of Twente. Dissertation.
Poortman, C. L., & Schildkamp, K. (2011). Alternative quality standards in qualitative research? *Quality & Quantity, 46*(6), 1727–1751.
Poortman, C. L., Illeris, K., & Nieuwenhuis, L. (2011). Apprenticeship: from learning theory to practice. *Journal of Vocational Education & Training, 63*, 267–287.
Poortman, C. L., Nelen, A., De Grip, A., Nieuwenhuis, A. F. M., & Kirschner, P. A. (2012). Effecten van leren en werken in het mbo: een review studie [Effects of learning and working in VET: a systematic review]. *Pedagogische Studiën, 89*(5), 288–306.
Reenalda, M. (2011). *Effecten van dualisering in het HBO. [Effects of dual higher professional education]*. Enschede: Universiteit Twente.
ResearchNed. (2012). *Kenmerken, wensen en behoeften deeltijd hoger onderwijs. [Characteristics, demands and needs parttime Higher Professional Education. Research report carried out for the Ministry of education]*. Nijmegen: ResearchNed.
Saylor, J. G., Alexander, W. M., & Lewis, A. J. (1981). *Curriculum planning for better teaching and learning*. New York: Holt, Rinehart and Winston.
Schaap, H., Baartman, L., & De Bruijn, E. (2012). Students' learning processes during school-based learning and workplace learning in vocational education: a review. *Vocations and Learning, 5*, 99–117.
Stake, R. E. (2000). Case studies. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 435–454). Thousand Oaks: Sage Publications.
Tynjälä, P., Välimaa, J., & Sarja, A. (2003). Pedagogical perspectives on the relationships between higher education and working life. *Higher Education, 46*, 147–166.
Van Bommel, M., Boshuizen, H. P. A., & Kwakman, K. (2012). Appraising the qualities of social work students' theoretical knowledge: a qualitative exploration. *Vocations and Learning, 5*, 277–295.
Veillard, L. (2012). Transfer of learning as a specific case of transition between learning contexts in a French work-integrated learning programme. *Vocations and Learning, 5*, 251–276.
Yin, R.K. (1984). *Case study research: Design and methods*. Beverly Hills, CA: Sage publications.
Yin, R. K. (2003). *Case study research: Design and methods*. Thousand Oaks: Sage Publications.
Zitter, I., & Hoeve, A. (2012). Hybrid learning environments: Merging learning and work processes to facilitate knowledge integration and transitions. *OECD education working papers, No. 81,* OECD Publishing. doi:10.1787/5k97785xwdvf-en

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