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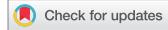
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# Supporting Apprentices' Integration of School- and Workplace-Based Learning in Swiss Initial Vocational Education and Training

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## ABSTRACT

In a dual initial vocational education and training (IVET) system, an integration between school- and work-based learning is essential to provide apprentices with necessary trade-specific skills and to ensure the quality of training. However, apprentices often perceive a disconnection between learning sites. Accordingly, based on the concepts of boundary crossing and school-workplace connectivity, this study aimed to investigate how the integration between school- and work-based learning contributed to the quality of Swiss IVET from the perspective of apprentices, vocational teachers and in-company trainers. Data were collected through focus groups (n = 64) and thematic data analysis was carried out following an inductive and deductive approach. Key findings indicated some issues related to sociocultural differences between school and training company: a general devaluation of school-based learning (non-aligned with workplace-learning or perceived as useless) and the diversity of apprentices' experiences at the training company. Furthermore, the analysis revealed how these situations perceived as disconnected can become learning opportunities: by applying a skill acquired at school in the workplace that is not part of the routine (learning mechanism of transformation); by bringing in the classroom authentic situations experienced by apprentices at work (learning mechanism of reflection). Implications for training and teaching are addressed.

## KEYWORDS

Swiss dual IVET; perceived IVET quality; school- and workplace-based learning; boundary crossing; school-workplace connectivity

## 1. Introduction

At the end of compulsory schooling, two out of three young people in Switzerland undertake an apprenticeship in the initial vocational education and training (IVET) system (Swiss Federal Statistical Office [FSO] 2017). The majority of them do so by following a dual format – that is, by spending one or two days per week in a vocational school and the rest of the week in a company where they receive training (hereinafter referred to as the

‘training company’).<sup>1</sup> Thus, apprentices pursuing what is known as ‘dual IVET’ are expected to combine knowledge, skills, and attitudes acquired from both the vocational school and the training company (Baartman and De Bruijn 2011). Although this multiplication of contexts might enrich apprentices’ experience, it also creates challenges in terms of integration of school- and workplace-based learning, primarily because of the sociocultural gap existing between the school and the workplace (Eraut 2004). Indeed, sociocultural perspectives of learning consider that learning is situated and influenced by the context where it is produced. In this framework, analytical tools such as boundary crossing and connectivity (Guile and Griffiths 2001) can help in understanding how to integrate practices from multiple learning sites to result in effective learning. Combining learning from several learning sites is a challenging task: to understand why, we provide here some contextual elements to illustrate the main differences between vocational school and training company. Indeed, these two contexts have their own distinctive characteristics and specific logics (Gurtner, Furlan, and Cattaneo 2018; Gurtner et al. 2012; Prenzel and Drechsel 1996; Tynjälä 2008), as summarised in Table 1, and therefore they constitute two different cultures of learning. Although other types of dichotomies exist between school and workplace, this article focuses on two that are particularly relevant in IVET contexts (Akkerman and Bakker 2012): in epistemic culture (e.g., type of knowledge shared) and in identity positions (e.g., roles and positions of apprentices in the two contexts). The vocational school bears the characteristics of a formal educational setting where the main activities are oriented towards the transmission of knowledge with several teachers with a specific pedagogical training. At the training company, activities tend mainly towards production and, to a minor extent and more indirectly, to the transmission

**Table 1.** Overview of the main differences between vocational school and training company.

Object	Vocational School	Training Company
<b>Context</b>	Formal, structured, scheduled Supervision of an entire class	Informal, more or less structured, unpredictable Supervision of one or a small group of apprentices
<b>Teaching and training staff</b>	Teachers: strong pedagogical preparation Multiple and relatively independent	Trainers: Weak pedagogical preparation Multiple and mutually dependent
<b>Type of Knowledge</b>	Explicit and generic Conceptual Inert	Implicit, tacit, and situational Procedural Applied
<b>Assessment</b>	Tests and exams Sporadic feedback	In authentic situations Frequent/individualised feedback
<b>Feeling of belonging Motivation and Commitment</b>	Weak Controlled and moderated	Strong Autonomous and high
<b>Apprentices’ Status</b>	Pupils, dependent, infantilised	Workers, independent, empowered

Note: This table is based on Gurtner et al. (2012), Gurtner, Furlan, and Cattaneo (2018) and Tynjälä (2008).

of knowledge (Resnick 1987). According to the size of the company, trainers usually also work in the main activity of the company. For instance, in small enterprises, the person who trains the apprentice(s) is often the boss (Lamamra, Duc, and Besozzi 2019). At the level of epistemic culture, at school, knowledge is usually more abstract, generic, and explicit, whereas at the training company it is more applied, specific, and implicit. In terms of identity positions, apprentices are often perceived – and perceive themselves – as pupils at school, and as workers at the training company, with consequences on their engagement and commitment (Wenger, Sauli, and Berger 2021).

The Swiss IVET system has several strengths in terms of integrating school- and work-based learning, such as a curriculum that is shared between learning sites and strong partnerships between stakeholders (Aprea and Sappa 2015). Nevertheless, some apprentices encounter difficulties in integrating learning acquired at school *vs* at the training company, and perceive a disconnection between the two (Filliettaz, De Saint-Georges, and Duc 2008; Gurtner, Furlan, and Cattaneo 2018; Sappa and Aprea 2014).

The data presented herein were derived from a larger project on what constitutes ‘quality’ in the Swiss IVET system from the apprentices’, vocational teachers’ and in-company trainers’ perspectives. Among the various elements that spontaneously emerged in participants’ conceptions of IVET quality, the disconnection between school- and work-based learning was an important one. Therefore, with this study we are interested in further investigating what determines and fosters a connection between school- and workplace-based learning from the point of view of stakeholders on the ground (apprentices, teachers, and in-company trainers). The study positions at the individual level of connectivity (*vs* organisational and institutional levels), which refers to teaching and learning processes at school and at the workplace and to the integration of different types of knowledge across learning sites (Stenström and Tynjälä 2009). To achieve this, we adopt a sociocultural perspective, and the integration of school- and workplace-based learning is conceptualised as a matter of boundary crossing and connectivity. By using two examples of perceived disconnections between school and training company, we will show how the differences between the two learning locations can be used as learning opportunities.

## 2. Conceptual framework

### 2.1 *Boundary crossing: a way to conceptualise learning across several sites*

The integration of school- and workplace-based learning has been conceptualised by several perspectives (Tuomi-Gröhn and Engeström 2003). More cognitive-functionalistic and individual-centred perspectives draw upon the

‘transfer metaphor’, for which learning is seen as ‘a largely one-way mechanical process in which students acquire knowledge in vocational school and relatively unproblematically “apply” it in the workplace’ (Guile and Young 2003, 64). Conversely, the sociocultural standpoint views learning as a social process influenced by the contexts in which it takes place, making this type of learning ‘situated’ (Lave and Wenger 1991). According to this perspective, the notion of ‘boundary crossing’ is preferable to the one of ‘transfer’, because it more thoroughly describes the process in which a person moves and interacts across different sites and their respective social cultures, or ‘boundaries’ (Guile and Griffiths 2001; Suchman 1994). In addition, the term highlights the fact that learners’ participation in unfamiliar activities and contexts means they have to continuously construct, combine, and renegotiate meaning – resulting in hybrid knowledge that makes sense in new contexts (Engeström, Engeström, and Kärkkäinen 1995). Compared to the notion of transfer, where transitions are unidirectional, boundary crossing entails bidirectional actions and interactions across contexts. Finally, it is important to note that finding ways to combine the differences between contexts by crossing their boundaries is seen as an opportunity for learning (Akkerman and Bakker 2012).

The literature identified four learning mechanisms at stake when people cross boundaries (Akkerman and Bakker 2011; Akkerman and Bakker 2017): identification, coordination, reflection, and transformation. *Identification* occurs when the identity of one or more practices is not clearly defined and there is a need to redefine it. Thus, learning is supported by processes of othering (identifying different aspects between practices), and of legitimating coexistence (identifying complementary aspects within practices). *Coordination* imply the use of boundary objects or procedures that ensure an effective collaboration across practices. Boundary crossing can also trigger a process of mutual *reflection*, in which people ‘realize and explicate differences between practices and thus to learn something new about their own and others’ practices’ (Akkerman and Bakker 2011, 144–145). Learning something new can be done either by defining your own perspective in relation to the perspectives of others (perspective making), or by looking at your own perspective through the eyes of someone else (perspective taking). *Transformation* is the process which leads to changes in practices and, sometimes, even to the creation of new hybrid practices.

## 2.2 The school-workplace connectivity model

Based on this sociocultural background, Guile and Griffiths (2001) analysed the connections between learning at the vocational school and the workplace through the notion of work experience, defined as ‘the use of the workplace in a way which supports learners in connecting different types of

knowledge, skill and experience’ (Griffiths and Guile 2004, 56). They identified five models of work experience, from a traditional one – where apprentices are expected to automatically adjust to the work’s requirements without any guidance – to a connective one, in which learners are supported to resituate knowledge in several contexts through boundary crossing. In this context, the notion of ‘connectivity’ refers to ‘those processes which aim at creating close relationships and connections between different elements of learning situations, contexts of learning, and systems aiming at promoting learning’ (Stenström and Tynjälä 2009, 4). Guile and Griffiths (2001) considered the connective model to be ideal in terms of learning through work experience. Hence, the connective model questions the modalities through which the connections between learning sites can affect learning processes. The transfer of knowledge from one context to another is not automatic and needs to be supported by connective strategies at different levels (individual, organisational and institutional; Stenström and Tynjälä 2009). Integration occurs when apprentices are supported to ‘mediate between theoretical and everyday knowledge to create new knowledge and new practices’ (Griffiths and Guile 2004, 17), a description which also encapsulates the idea of boundary crossing.

### **2.3 Practices to integrate school- and work-based learning**

A key outcome of connecting school- and work-based learning is the development of connective and polycontextual skills in apprentices. Connective skills are developed when learners are able to establish meaningful links across contexts; polycontextual skills are developed when learners are able to perform different tasks in multiple contexts (Engeström, Engeström, and Kärkkäinen 1995). Apprentices need to be supported in their attempts to develop both. Griffiths and Guile (2004) identified four practices that can foster this development: (1) acquiring theoretical knowledge to be able to understand and interpret a phenomenon as it appears in reality; (2) using a process of dialogic inquiry to learn the specific languages of the communities of practice<sup>2</sup> in which apprentices participate to become members of those communities; (3) crossing boundaries between the school and the training company, which means being able to establish continuity between the two sites despite their sociocultural differences; and (4) resituating knowledge and skills through horizontal development (Beach 1999). Horizontal development implies that the learners ‘acquire forms of knowledge embedded or situated in specific contexts. Moreover, this situated knowledge can take a variety of forms’ (Griffiths and Guile 2004, 69). Therefore, to develop connective and polycontextual skills that allow them to integrate school- and work-based learning, it seems important that apprentices directly experience the same activity in different contexts to

encounter its different variants. Nevertheless, concrete experience alone is not enough to learn; apprentices also need to reflect on their experience (Schön 1987). Accordingly, the connective model emphasises reflexivity and the need for teachers and in-company trainers to provide guidance in reflective practices (Sappa, Aprea, and Vogt 2018; Tynjälä 2008).

In the Swiss IVET context, Sappa, Aprea, and Vogt (2018) realised a study on how key stakeholders (teachers, trainers, apprentices, and examiners) perceive the links between learning at school and at the training company. The study highlights the importance to encourage connective strategies not only at school, but also at the training company; as the connection is often considered to be the sole responsibility of the school. At the vocational school, the adoption of a student-centred perspective rather than simply following the logic of the disciplinary content can help to establish a connection. Concretely, the structure of the instruction ‘should begin at the level of learners’ knowledge and experience and end by initiating the transfer to the workplace setting’ (Sappa, Aprea, and Vogt 2018, 317). At the training company, trainers can help apprentices to recognise the links between knowledge acquired at school and practices in the workplace by staying actively informed on what is happening at school. The role of teachers and in-company trainers is therefore crucial in supporting the development of apprentices’ polycontextual and connective skills.

#### **2.4 Aims and research questions**

In the Swiss IVET context, few studies consider the perspective of its main stakeholders (apprentices, vocational teachers, and in-company trainers) in terms of connection between learning sites. Using the concepts of boundary crossing and school-workplace connectivity, we want to consider stakeholders’ conceptions of the integration of school- and work-based learning in detail. Accordingly, the questions that are central to this study are: (1) Which problems of integration between school- and workplace-based learning are identified by apprentices, teachers, and in-company trainers and how are these problems explained? (2) What are the potential solutions – based on actual practices – to improve the integration of school- and work-based learning according to the perspectives of boundary crossing and of school-workplace connectivity?

#### **Methods**

This research was part of a larger project that included several studies which examined the conceptions of IVET quality using both quantitative and qualitative methods. The data of the first study, which aimed to understand how stakeholders perceive IVET quality, are analysed in this paper.

### 3.1 Participants

We conducted 14 focus groups with 64 participants in the French-speaking part of Switzerland. The groups were uniform in terms of stakeholders (apprentices, vocational teachers, and in-company trainers) and in terms of occupational fields: a) hairdressing and beauty, b) construction (e.g., road builder, electrician), c) retail and d) administration (e.g., administrative assistant).<sup>3</sup> The first three occupational fields are among the ones in which premature contract terminations are more frequent in Switzerland. In contrast, premature contract terminations are the least frequent for administrative assistant (Swiss Federal Statistical Office 2019a). Women are more represented in the field of hairdressing and beauty, men are more represented in the field of construction, and both women and men are more equally distributed in the fields of retail and administrative assistant (Swiss Federal Statistical Office 2019b).

The sampling strategy consisted of selecting participants according to their role (apprentices, teachers, or in-company trainers) and occupational field. We ensured a certain heterogeneity within the groups: apprentices from different school years, teachers of different school subjects, and trainers from different companies in terms of size and service/product provided. We selected both novice and experienced teachers and trainers. In addition, participants came from different geographical areas, i.e., four out of six regions in the French-speaking part of Switzerland. Groups included from three to seven participants, which allowed every participant to express her or his opinions and ensured smooth discussion. Each focus group started with three participants, and selection was stopped when the maximum number per group (seven participants) was attained. Participation to the study was voluntary, which partially explained the variability in groups' size. [Table 2](#) shows the distribution and characteristics of the participants.

Apprentices were all attending dual IVET, which in Switzerland takes place after compulsory education. It lasts three or four years and apprentices attend a vocational school during one or two days per week, while the remaining days they work and learn in a training company. In terms of size of companies in which apprentices were enrolled, 34% worked in micro companies (less than 10 employees), 19% in small companies (between 10 and 49 employees), 19% in medium companies (50–249 employees), and 28% in large companies (more than 250 employees). In addition, 41.5% of the apprentices had started another training course before the apprenticeship (e.g., at a high school).

**Table 2.** Distribution and characteristics of the participants.

Professional field	Apprentices	IVET school teachers	In-company trainers	Total
Hairdressing and beauty	2 groups: n <sub>1</sub> = 6; n <sub>2</sub> = 7 M <sub>age</sub> = 21;4 Gender: 10 F/3 M	n = 3 M <sub>age</sub> = 36;0 Gender: 3 F	n = 3 M <sub>age</sub> = 52;0 Gender: 3 F	n = 19 Gender: 16 F/3 M
Construction	n = 6 M <sub>age</sub> = 21;7 Gender: 6 M	n = 7 M <sub>age</sub> = 50;7 Gender: 1 F/6 M	n = 4 M <sub>age</sub> = 40;2 Gender: 4 M	n = 17 Gender: 1 F/16 M
Retail	n = 6 M <sub>age</sub> = 18;7 Gender: 5 F/1 M	n = 4 M <sub>age</sub> = 46;8 Gender: 2 F/2 M	n = 5 M <sub>age</sub> = 45;4 Gender: 2 F/3 M	n = 15 Gender: 9 F/6 M
Administrative assistant	2 groups: n <sub>1</sub> = 4; n <sub>2</sub> = 3 M <sub>age</sub> = 20;4 Gender: 6 F/1 M	n = 3 M <sub>age</sub> = 47;3 Gender: 2 F/1 M	n = 3 M <sub>age</sub> = 42;0 Gender: 3 F	n = 13 Gender: 11 F/2 M
Total	n = 32 M <sub>age</sub> = 20;7 Gender: 21 F/ 11 M	n = 17 M <sub>age</sub> = 46;6 Gender: 8 F/9 M	n = 15 M <sub>age</sub> = 44;7 Gender: 8 F/7 M	N = 64 Gender: 37 F/ 27 M

Note: M<sub>age</sub> = Year; months.

Teacher participants had an average of 13.6 years of experience, while in-company trainers had an average of 17.6 years of experience; 41% of teachers worked less than half-time; 24% worked between 51 and 80%, and the remaining 35% worked more than 80% (considered full-time). Among the trainers, 20% worked part-time (<80%) versus 80% full-time.

### 3.2 Data collection

We collected the different views on the quality of dual IVET using the focus group method (Duchesne and Haegel 2008; Kitzinger 1995). This method consists of simultaneously interviewing several people whose experiences or professional affiliation are partly common. This method favours the analysis of what is shared in the group, whether in terms of attitudes, beliefs, or norms. We considered the focus group to be a suitable method for our aim because it has the potential to provide multiple perspectives on the topic of IVET quality and to stimulate argumentation between participants. Two members of the research team carried out the focus groups: one led the interview and the other took notes on non-verbal behaviours and other events during the interview. We developed a procedure and an interview guide to ensure consistency across interviews, which were semi-directed. Examples of questions are: ‘Can you mention some positive points of your training at school/training company supported by examples?’ or ‘Can you give us an example of poor quality in your training at school/training company?’. Focus groups lasted on average one hour. At the end,

a summary of the major themes emerged during the discussion was sketched on the whiteboard, so that participants could check, add, or correct what was said. Focus groups were audio recorded and fully transcribed.

### 3.3 Data analysis

We analysed the data at the group level rather than at the individual level. Accordingly, the results are to be understood as reflecting the collective conceptions of IVET stakeholders. We analysed the transcriptions using thematic analysis (Krippendorff 2013; Miles and Huberman 1994; Saldaña 2013), with a hybrid approach of deductive and inductive coding (Fereday and Muir-Cochrane 2006). The corpus of data was first analysed with an inductive approach and open coding to be close as much as possible to the data. We later developed broader categories and links between them, by using existing theories (deductive approach). The two first authors coded the material and discussed findings with the third author on a weekly basis to ensure the validity of interpretations. The coding scheme was refined over several rounds and the overlap between codes was reduced. Each code was assigned a clear label with a definition, a description, inclusion and exclusion criteria, and examples (Saldaña 2013). Seventeen codes emerged as key aspects of IVET quality. Only the code *Links between theory and practice* ( $n = 88$  coding units) is analysed in this paper.

The code *Links between theory and practice* was named based on the terms used in our sample: the participants' conception of the alignment between school and training company is addressed by the terms 'theory' (related to school-based learning) and 'practice' (related to work-based learning). Therefore, this code refers to the degree of adjustment between conceptual and procedural knowledge,<sup>4</sup> but also to didactical methods, assessment techniques, and forms of guidance, as explained by Messmann and Mulder (2015) regarding the alignment between school and workplace.

To answer our research questions, we analysed data through the perspective of apprentices, teachers, and in-company trainers. Differences in terms of professional fields were not relevant in our sample, therefore no data are reported on this topic.

## 4. Results and discussion

In this section, we outline the analysis of two issues related to boundaries between school and training company that emerged in participants' discourses. By starting from practices perceived as disconnected, we tried to demonstrate how these problematic situations can be turned into learning opportunities by exploiting the mechanisms of boundary crossing and school-workplace connectivity. The issue of non-alignment and of

uselessness of school content was raised by apprentices and in-company trainers; while the management of apprentices' workplace experiences emerged among teachers. These two transitions at the boundaries between school and training company also reveal differences in terms of epistemic culture and identity position.

#### **4.1 Reducing the feeling of non-alignment and of uselessness of school contents: training company as testing ground**

Apprentices and in-company trainers raised the problem of a non-alignment between school- and workplace-based learning and of a feeling of uselessness of contents taught at school. The integration of school- and work-based learning was mainly described as learning the 'theory' at school that is put into 'practice' at the training company (as in the transfer metaphor). According to some apprentices and in-company trainers, this was not possible because the knowledge gained at school was not consistent with the knowledge gained within the training company (and vice-versa), ending up in a feeling of non-alignment. Links between school and training company were qualified as irrelevant, outdated, too generic, or too specific, and teaching and training methods were described as different between the two sites.

In addition to non-alignment, apprentices and in-company trainers reported a feeling of uselessness of school-based learning. Some apprentices considered the content of vocational school classes relevant only if it was a subject in the examination or if it could be immediately applied in the context of the company in which they were undergoing training. In other words, the link between school- and work-based learning was perceived by some apprentices to be associated with the concept of utility value, which is 'determined by how well a task relates to current and future goals' (Eccles and Wigfield 2002, 120). Accordingly, for certain apprentices, school learning content that was not useful *hic et nunc* was considered unnecessary, and should have therefore been eliminated from the school curriculum. Apprentices referred to general knowledge class, sports, languages, and professional knowledge that was not immediately useful in their training company. For instance, for clerks, learning meat sales techniques when working in a cheese factory was not deemed to be useful. Apprentices' scepticism towards general disciplines was also found by Wedege (1999) in her study on mathematics. The discourses of several in-company trainers of our sample go in a similar direction: they perceive part of the training at school as useless, invoking an evolution of the trade and the incapacity of school to stay updated. The perspectives of apprentices and in-company trainers are somewhat utilitarian and imply a criticism of school-based learning and its capacity to adequately fulfil the needs of apprentices and

companies alike. Such findings find place in a more general debate about the retention of certain theoretical subjects (like general culture and languages) in vocational curricula, which is justified by social and democratic principles (Young 2007; Wheelahan 2012). While Tanggaard (2007) found similar evidence for a devaluation of school-based learning, she explains it differently, saying that ‘to be able to “connect” to something (e.g. the workplace), the apprentice may need to disengage either discursively or practically from other places’ (Tanggaard 2007, 465). In fact, to achieve the necessary familiarity with the community of practice of the trade, apprentices may prioritise engagement in the training company over school both at the cognitive and identity level.

To reduce the feeling of non-alignment and of uselessness of certain contents, some apprentices tried to apply at the training company what they learned at school. Indeed, they were reporting as a positive aspect of school, the possibility to acquire some knowledge that is not transmitted at the training company. This was mostly due to a lack of time, a lack of skills, or because the company does not cover all the activities of a trade (domain specificity). In Fragment 1, hairdressing apprentices discussed about some advantages of school-based learning.

Fragment 1. Exchange between hairdressing apprentices.

- |              |  |
|--------------|--|
| Apprentice 1 | Well, I find that at school, we learn things that we don't necessarily experience at the salon. [...]  |
| Apprentice 2 | A lot of things and things you don't learn at the salon. [...]   |
| Interviewer  | Is that something positive or negative?  |
| Apprentice 2 | Hum hum, yeah, it's positive.  |
| Apprentice 3 | Positive. [...]  |
| Apprentice 4 | Sometimes there are methods how to make, for example, strands of hair or things like that, we use that easily because we say, ‘We learned that in the course, why not use it?’. At the salon, yes, we have different methods, but it's also good to test the methods we learn at school. |
| Apprentice 5 | Then even for the customers, it's good. Honestly professionally, if you can say the terms that are correct.  |
| Apprentice 4 | The right terms.   |
| Apprentice 5 | Well, yeah. If we talk professionally [...] well, we're going to be taken seriously. [...] Regarding the customers, when you have to sell a product, for example ...   |

We use terms that are professional and therefore come from school because it's true that it's more where we learn them, the real professional terms. And then, afterwards, we can give explanations when we advise a client [...] we finally see the reactions and all that, we also know how to defend ourselves vis-à-vis the client.

As apprentices in Fragment 1 reported, school-based learning imparts the norm (e.g., standard ways to perform a task, proper nomenclature for tools or procedures). The knowledge learned at school generates actions and interactions at the training company and has an impact on apprentices' cognition and identity. It can underpin and legitimate apprentices' practice in the workplace ('[...] we use terms that are professional and therefore come from school [...] we can give explanations'), therefore making them feel more empowered ('we're going to be taken seriously, [...] we finally see the reactions [...] we also know how to defend ourselves [...]'). This has benefits in terms of identity: apprentices feel more recognised as professionals, more self-confident in their relationships with trainers, colleagues, and customers (Akkerman and Bakker 2012), more familiar with the community of practice of their trade (Tanggaard 2007) and trigger processes of learning. This can be related to a process of dialogic inquiry, where apprentices can better connect school and training company by being immersed in the linguistic practices of each context.

The underlying idea here is to use the training company as a testing ground to apply knowledge acquired at school (e.g., new methods, professional vocabulary etc.), that is not part of the actual practices at work. This can lead to a process of change, or creation of new practices, that combine elements both from school and training company. From a perspective of boundary crossing and connectivity, the learning mechanism at stake here is transformation through horizontal development. Indeed, the confrontation with a problem (i.e., non-alignment and perception of uselessness), forces apprentices embedded in two intersecting contexts to create new practices. In [Figure 1](#) we tried to represent on a schema the links between the various elements introduced in this section. The schema has two axis: the vertical one represents epistemic culture (from more abstract to more practical knowledge), and the horizontal axis stands for apprentices' identity position (from the apprentice seen as a novice to the apprentice seen as a professional). The upper-left part of the schema refers to school, while the lower-right to training company. Interestingly, a difference between school and training company at the level of epistemic culture (i.e., gap between what is taught at school and at the training company), can be associated to positive outcomes in terms of identity position at work (i.e., more self-confidence as professional) through processes of transformation.

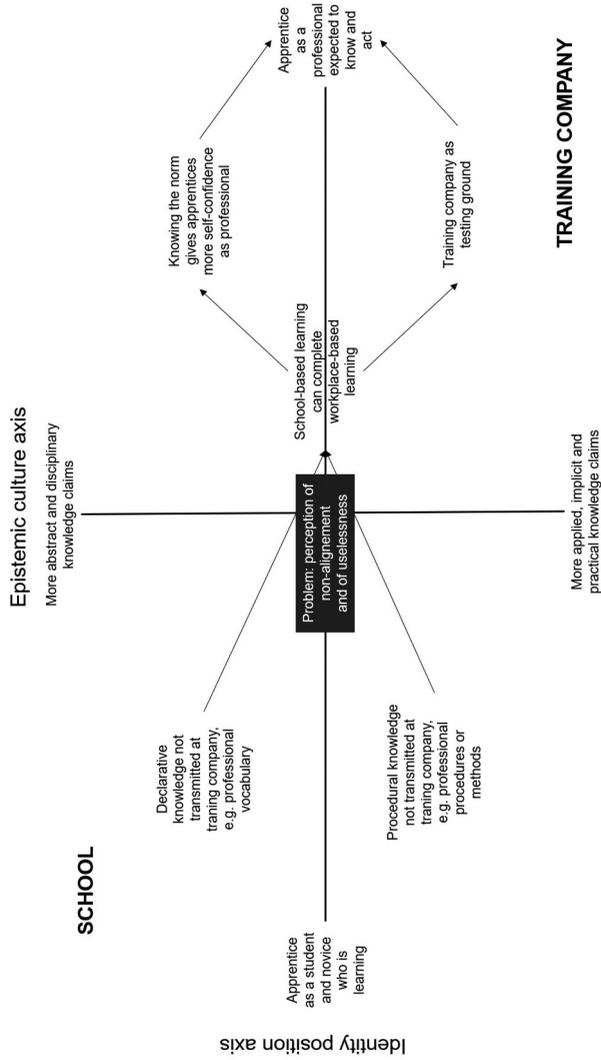


Figure 1. Elements of non-alignment and feeling of uselessness of school content.

Another perspective about the relevance of school content, was given by teachers and, to a minor extent, by some in-company trainers. They felt that it was important for apprentices to develop a broader and more long-term vision. In other words, it would benefit apprentices to realise that school-based learning could also be useful beyond the professional context, as well as for companies specialising in domains other than the one with which they were currently engaged: ‘To broaden their vision a little bit ... there’s a world around you and then you must prepare for working life too, in a broad vision’ (Administrative assistant’s teacher). Such findings are in line with those of Akkerman and Bakker (2012), where both teachers and trainers expect students to move beyond knowing some topics.

#### ***4.2. Managing the heterogeneity of apprentices’ experiences to gain new insights on one’s own and others’ practices***

Teachers identified the topic of heterogeneous experiences of apprentices at the training company. In dual IVET, teachers at the vocational school often have to deal with apprentices who are all learning the same trade, but in different workplaces. Fragment 2 reports the discussion of construction teachers that taught in both school-based vocational tracks (where apprentices only attend vocational school) and dual tracks (where apprentices alternate between vocational school and training company). Comparing these two tracks gave new insights about the consequences of the integration of school- and workplace-based learning.

Fragment 2. Exchange between construction teachers.

Teacher 1                   [... ] here at school we have programmes that are still relatively structured [...], so the students they don’t know everything that’s out there so they follow that path, they accept it. In the dual track, I have 18 students; out of 18 students, there are 18 different in-company trainers and 18 different ways of working, so when I teach something in theory I always have to put in quotation marks – I have to say this is something that can be done like that, according to the standards it’s correct but it’s- ‘yeah but I don’t do it like that in the office!’ [the teacher imitates one of his apprentices]. Yes, I know there are 18 of you with 18 different cases, but there is the right way to do it but, then, all the variants are possible so ... we are actually often a little bit in conflict [...]

- Teacher 2                    and the correct thing to do as if you ask for a legal opinion you don't really know ... there are all the variants from the beginning [...]
- Teacher 1                    so that for us, as teachers of the dual system, it's still pretty complicated, getting students to understand that there's not one solution, but there's a right direction.
- Teacher 3                    on the other hand, this is perhaps a positive element of the dual training and I have the impression that the students see more variety in the ways of doing things [...] in school-based track students I have the impression that either they do right or they do wrong and when it's right it's just that this way, there are no other ways.

First, in dual tracks, apprentices interacted, shared, and confronted their workplace experiences, while in a school-based track they 'accepted what the teacher say'. For Tanggaard (2007) peer groups in dual tracks 'challenge and inspire each other with their unlike perspectives and experiences from different trade practices' (461). The confrontation can include elements of both epistemic culture (e.g., tasks assigned at the workplace) and identity position (e.g., the status and the responsibilities attributed to apprentices at the workplace). Secondly, knowledge was conceived differently in dual or school-based tracks, with consequences on teachers' practices. In dual tracks, teachers had to adapt to a more work-based learning style, with higher error tolerance, problem-solving orientation, situations of insecurity and variations to the norm. In school-based tracks there was a more cognitive-functionalistic vision, where school was the learning context, and the workplace was the application context. Knowledge was 'based on exact principles and explicit rules' (Tanggaard 2007, 455), and for students' knowledge was either right or wrong. For these reasons, teachers found it more challenging to deal with apprentices from dual tracks. They had to continuously find a balance between imparting the norm and showing the deviation from the norm, in order to adapt to the realities that apprentices experience at work. In boundary crossing situations, showing the variations from the norm is important to understand how a concept may vary in different contexts and develop polycontextual skills. Griffiths and Guile (2004) refer to this as being able to 'resituate' or 're-contextualise' knowledge. The exercise of alternating between norm and variations from the norm can put teachers in a difficult position, as expressed by an administrative assistant's teacher:

'I think dual-tracks are a double-edged sword. On the one hand, we give them [apprentices] a certain foundation, a certain economic or legal basis [...]. On the other hand, we have apprentices who are also employed in very specific sectors such as insurance or banking and when we approach these themes, it also obliges us to be particularly vigilant about what we say because there is a stronger interaction of students on the subjects we propose. [...] they don't hesitate to intervene, so it's true that it's both enriching and also we have to be very careful about what we say, the data we give.'

We can see from these focus groups excerpts, how different conceptions of a same aspect (e.g., heterogeneity of apprentices' experiences), can be seen as negative or positive. Indeed, the exchange in Fragment 2 started with a negative perception of heterogeneity of workplace experiences (i.e., difficulty to explain to apprentices the several ways to execute a task), and then evolved towards a positive view, for which teachers could draw upon this variety to show apprentices all the facets and complexity of a task. In addition, workplace experiences can constitute a good starting point for triggering reflection and make sense of experiences across contexts (Akkerman and Bakker 2011; Schön 1987). Indeed, the theoretical focus of school allows apprentices to reflect on the tasks they perform at work rather than simply performing them mechanically.

The way teachers conceived and managed the variety brought at school by apprentices, was particularly relevant to establish a certain degree of continuity between actions and interactions across contexts. As for [Figure 1](#), in [Figure 2](#) are outlined the various elements linked to the management of apprentices' heterogeneous practices.

From a perceived difficulty (i.e., diversity of apprentices' practices), a learning process can be triggered. According to a boundary crossing perspective, the learning mechanisms at stake here is reflection: it is by explaining to others your own workplace practice (perspective making), and hearing about other apprentices' workplace practices (perspective taking) that you can expand the knowledge about yourself and your own practices. This is true for apprentices, who benefit from sharing and interacting with peers, as well as for teachers. In front of the diversity of experiences brought in the classroom by apprentices, teachers become aware of the differences between the way to execute a task at school and at training companies, forcing them to adapt their teaching practices and epistemological beliefs.

## 5. Conclusions and suggestions for further research

### 5.1. Main contributions

School- and workplace-based learning are still mainly perceived as two disconnected practices: practical training takes place at the workplace, while theoretical training and development of generic skills occurs at the vocational

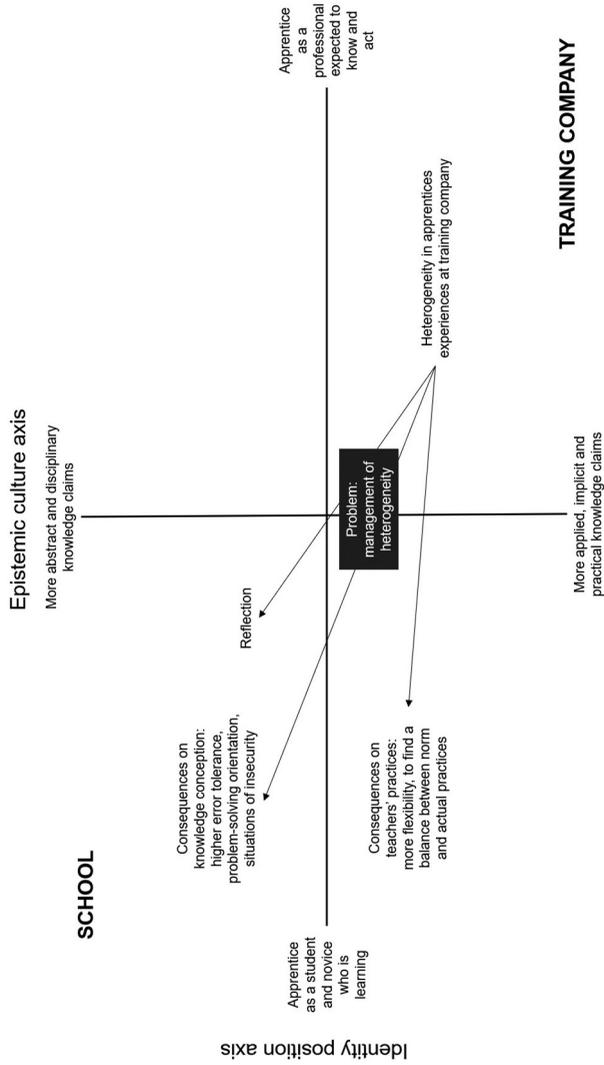


Figure 2. Elements of the heterogeneity of apprentices' experiences at the workplace.

school. Our analysis of focus groups with apprentices, teachers and in-company trainers identified some issues related to boundaries between school and training company (research question 1). A general devaluation of school-based learning (non-aligned with workplace-learning or perceived as useless) and the diversity of apprentices experiences at the training company, make it difficult to effectively connect two practices perceived as different in terms of epistemic cultures and identity positions. Our analysis revealed some mechanisms that exploit boundaries between school and training company as potential learning opportunities (research question 2). More specifically, by trying to apply a skill acquired at school in the workplace that is not part of the routine would be a chance to learn (learning mechanism of transformation); and, by bringing in the classroom authentic situations directly experienced by apprentices at work would similarly be an opportunity to learn from these situations and compare them with practices of peers (learning mechanism of reflection). Those two situations seem to establish some continuity between school and training company by relating their epistemic cultures and generating new practices. The examples provided are part of everyday life situations that are perceived and interpreted differently by the participants of the study. Seeing the differences between school and training company as an opportunity to learn – and not as an obstacle – can be a matter of attitude and awareness. Teachers and in-company trainers can play an important role in showing apprentices that practices that are perceived as disconnected at a first glance, can be used at their own advantage, and the responsibility to establish connection should be promoted both at the school, and at the training company.

The main aim of the study was to collect data about the quality of IVET. The theme of the integration between school and training company emerged spontaneously in the discourses of participants, showing its association with the quality of IVET. In addition, the multiple perspectives about the integration between school and training company echoes the literature about IVET quality. This latter means different things because it is related to the positions of stakeholders and their respective needs (Griffin 2017), e.g., for in-company trainers it is important to have skilled apprentices and therefore they expect that school training would be adjusted to the needs of the trade. By considering apprentices', teachers', and in-company trainers' conceptions we could collect data close to their reality. However, this procedure also brought some limitations. The questions addressed to apprentices, teachers and in-company trainers were about IVET quality, and not specific to the integration of school- and workplace-based learning. Therefore, data are sometimes not very detailed. We can also question the degree of generalisability of the results: even though we didn't find much difference between professional fields, could the same conclusions be drawn for other trades? Finally, we investigated only the individual

level of the framework of Stenström and Tynjälä (2009). A suggestion for further research would be to also investigate the organisational and system levels.

## 5.2 Implications

We generally stress the importance for teachers and in-company trainers to support and guide apprentices in connecting school- and workplace-based learning. In this regard, we suggest some guidelines for the possible implementation of certain practices based on the results of the current study. To improve the connection between school- and work-based learning, teachers and trainers might collaborate to:

- Encourage apprentices to use the professional vocabulary and stress why and how this is important in terms of mastering a task (e.g., being able to give explanation about a product) and being recognised as a professional of the trade.
- Ask apprentices to extend their classroom training with some form of validation in practical situations. The training company can serve as ‘testing ground.’
- Use the diversity of practices to highlight the inevitable gap that exists between a theoretical principle and its application.
- Develop pedagogical scenarios based on apprentices’ experiences in their workplaces, the aim being to engage them in abstract thinking and reflection. This can be done through boundary objects (for example, learning and performance documentation; Caruso, Cattaneo, and Gurtner 2016). To this regard, teachers and trainers can stimulate apprentices through prompts and questions, ask them to document an experience, link it and compare it with other experiences (De Bruijn and Leeman 2011).

Pedagogical models like the ‘Erfahrraum’ model (Schwendimann et al. 2015) or integrative pedagogy (Tynjälä 2008) try to combine all these elements and are therefore recommended to improve the quality of IVET curricula.

## Notes

1. Moreover, for a few weeks a year (depending on the occupational field), apprentices also learn at a third learning site through ‘branch courses,’ whose purpose is to complement school- and workplace-based training.
2. A community of practice is a group whose members regularly interact with one another and share experiences based on their common interests, resulting in learning (Lave and Wenger 1991).
3. Two focus groups with hairdressing and beauty apprentices and administrative assistant apprentices took place. This explains why there are 14 groups instead of 12.

4. Conceptual knowledge consists of ‘static knowledge about facts, concepts, and principles that apply within a certain domain’ (de Jong and Ferguson-Hessler 1996, 107). This type of knowledge is mainly taught at school; however, it is transmitted to a lesser extent within training companies (Eraut 2004). Procedural knowledge refers to ‘actions or manipulations that are valid within a domain’ (de Jong and Ferguson-Hessler 1996, 107), and is essential to being able to concretely perform a task. This type of knowledge is learned primarily at the training company.

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