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Peter Schlögl & Martin Mayerl

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'How' and 'why' cannot be separated: empirical insights into the company-based part of apprenticeship training in Austria

Peter Schlögl [a,b] and Martin Mayerl [b]

[a]University Klagenfurt, Klagenfurt, Austria; [b]Austrian Institute for Research of Vocational Training, Wien, Austria

ABSTRACT

In Austria, binding training objectives are defined for the company-based part of dual training (approximately 70–80 per cent of total training time), but there are scarcely any normative specifications on how these are to be achieved and there is no systematic quality assurance of the practice. The conditions under which vocational training occurs in the company have also scarcely been studied scientifically. Against this background, two surveys (of training companies and apprentices) were used to empirically investigate how vocational learning is specifically designed in Austrian training companies. The results show that the Austrian dual apprenticeship training model can be described primarily as a model of youth employment and secondarily as a training model. But it addresses the two goals of social participation and skill acquisition in an interlocked way. The variance of designs of the company practice is closely linked to the differing motives of the training companies. Based on these results, conclusions are drawn for vocational training policy, educational practice and relevant research, which take up the empirical connection found between a work design conducive to learning and the concrete company design of apprenticeship.

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Introduction

Despite growing interest in comparative research in vocational education and training (VET) in general, research on learning and work in particular is internationally highly fragmented (Gessler, Nägele, and Stalder 2021). However, there are also overarching themes in VET research, and especially in comparative political economy and comparative social policy research, collective skill formation systems have been studied for around two decades (Bonoli and Emmenegger 2022). Research predominantly looks at the political framework conditions, the governance of the VET system or the labour market effects, without specifically looking at the in-company process of skills acquisition.

CONTACT Peter Schlögl peter.schloegl@aau.at University Klagenfurt, Universitätsstraße 65-67, Klagenfurt A-9020, Austria; Austrian Institute for Research of Vocational Training, Margaretenstraße 166/2, Wien A-1050, Austria

On the one hand, typologies are used as a basis for comparisons (Busemeyer and Trampusch 2012), and on the other hand, the social integration and inclusion effect (Durazzi and Geyer 2019) of VET sectors have been considered. This has also led to resonance at the political level where, for example, countries assigned to corporate skill-formation systems present themselves as having comparatively low youth unemployment and are subsequently cited as role models for how the social participation of the younger generation is positively influenced and social exclusion countered (e.g. EU Council Recommendation on European Framework for Quality and Effective Apprenticeships EFQEA 2018). This addresses in particular the quality of vocational learning processes, and the question arises as to whether sufficient pedagogical capacities in company training are at all available to meet the rapidly changing demands of vocational learning.

Another facet of the debate concerns whether the traditional model of vocational training, as currently implemented in the form of apprenticeship training, can meet the increasing or rapidly changing demands in working environments (Busemeyer and Trampusch 2012, 27–33). In particular, the question arises as to whether apprenticeships are resilient enough to cope with multiple crises (climate, COVID-19, inflation, etc.), since apprenticeship training relies strongly on company engagement (CEDEFOP 2022). However, it has been shown in the past that apprenticeship systems are a stabilising factor for labour markets and employment systems (for Germany: Hüther 2017). Furthermore, in countries with apprenticeship systems, skill-based technological changes have had little effect on wage inequalities in the middle spectrum of occupations (Koomen and Backes-Gellner 2022).

In this respect, a paradoxical debate about the future viability of the traditional apprenticeship model is emerging, whereby – at least in Europe – the positive view of this model currently prevails in many cases. Apprenticeships are considered to be of great importance for social integration and the stability of labour markets and employment. But it can be seen that policy papers and also research approaches focus on either systemic perspectives or different goals of vocational education systems. The extent to which there are connections between overarching goals and concrete designs of practice, on the other hand, is given little or no attention.

Whether these different requirements that are mentioned can be met or to what extent, however, is often decided in the concrete implementation at the micro level of training itself, that is, training in a company. It is striking, however, that little is known and that an empirical overview is lacking concerning the concrete implementation by companies of this systemic model of linking working and learning in the context of apprenticeship training, which is a comprehensive segment of vocational education at the upper secondary level in Central Europe.

The Austrian case

This lack of knowledge and empirical understanding will be addressed in the following on the basis of the Austrian apprenticeship system, which is characterised by the following specifications. In general, the Austrian VET system can be classified by high state commitment (nationwide training regulations, publicly funded part-time vocational schools) and high firm involvement (Busemeyer and Trampusch 2012). Nevertheless,

in a comparative study of Central European apprenticeship systems (Rauner and Wittig 2010) that focuses on middle-skill level occupations, the Austrian model of in-company vocational training has been described as comparatively weakly coordinated. Furthermore, the occupational profiles trained are highly specialised and very fragmented in terms of subject matter (currently 210 different training occupations as of 1 September 2022). Many actors are involved in the governance of this sector, which shows a certain degree of federalism and clearly corporatist elements. Thus, under general state responsibility, both social partners and companies are in charge of the steering and implementation of VET. And around 30,000 recognised training companies are continuously involved in the training of skilled workers and, after all, around 75% of the total training time is spent on in-company training (Schlögl, Stock, and Mayerl 2019, 278).

However, beyond the standardised training duration, the law does not provide any normative specifications and standards on how these goals are to be achieved in the company-based part of the training (Schlögl 2015). On the one hand, this gives training companies a great deal of leeway in designing the learning process in the company environment (Bliem, Schmid, and Petanovitsch 2014), but on the other hand, it leads to permanent system-immanent tensions over a desirable specific design: employer representatives try to keep control over a company's sphere of influence, while employee representatives work towards strengthening inter-company training elements (Durazzi and Geyer 2019; Schlögl et al. 2020).

The diverse but extensive work-integrated (learning) processes that have to be designed and organised by the individual training companies are largely left out of the national governance and the concrete implementation in companies remains a kind of black box. The aim of this paper is therefore to shed some light on the practice of apprenticeship training in Austrian companies. It will become apparent that, against the background of companies' motives for involvement in training (*why* they decide to train), the form that in-company training practice takes (*how* they do it) is not without significance.

A framework for understanding the integration of work and learning in apprenticeships

Internationally, Germany, Austria, and Switzerland are considered model countries for the implementation of apprenticeship systems (Rauner and Wittig 2010; Steedman 2012) and to have prototypically 'well-designed apprenticeship schemes' (EC 2018). Nevertheless, in recent years, comparative VET research has shown that these apprenticeship systems are superficially very similar but that the underlying mechanisms are likely to be fundamentally different (see Busemeyer and Trampusch 2012; Dionisius et al. 2008; Moretti et al. 2019).

Apprenticeship in general can be understood as the most comprehensive form of workplace (Steedman 2012) or work-based learning (Talbot 2019). Vocational learning – detached from different learning theory models – can basically be conceptualised according to an experience-based development model (Dreyfus and Dreyfus 1980). According to this concept, vocational learning occurs in the step-by-step growth of vocational ability to act by mastering initially simple work situations until one can confront increasingly complex demand situations (Rauner 2002).

Thus, it can first be deduced that the apprenticeship scheme of vocational learning occurs through the accomplishment of concrete learning and work tasks in actual or, to a lesser extent, simulated work situations that are challenging for learners and provide stimulation and impetus for individual competence development. Real work situations, at least those that require skilled work, and the standards that apply to them are not exclusively a rule-bound application of (cognitive) concepts or theories, but can also be understood as participation in 'communities of practices' (Wenger 1998) in respective domain-specific, context-dependent fields of action. In this context, professional learning is understood as social learning, in that the implicit and explicit rules, roles, goals, instruments, actions, etc. of a community of experts are learned through participation. In other words, embedding in a community of practice is the prerequisite for professional socialisation and the development of a professional identity (Lewin 1982, 163).

In this sense, work-based learning overcomes the understanding of workplace learning as informal, disorganised learning or cumulative experiential learning (Manuti et al. 2015). Specific work situations and tasks are specifically enriched with elements that promote the learning process according to pedagogical criteria. By appropriately enriching the accumulation of experience in the work process with formal elements, a space is opened in which one's own actions, courses of action, and alternatives are reflected upon and related to one's own knowledge of action (Dehnbostel 2007, 68). This points to a second aspect of learning in the work process – the tasks of consciously designing work processes in a way that promotes learning, such as full integration into the work process, problem-solving of tasks, opportunities for professional development, social support from the work community, and reflexivity (e.g. Dehnbostel 2007; Fuller and Unwin 2011; Tynjälä 2008). Accordingly, an enriched benefit of vocational learning must be assumed, which is not to be thought of in terms of the acquisition of skills alone, but participation can be regarded as an essential component of skill formation. Playing off one point of view against the other was already named as a danger early on (Sfard 1998).

In this context, educational economics postulates the hypothesis that the training motives of training companies influence a company's decision concerning how training should be specifically organised (Wenzelmann 2012). The central economic rationale for the postulated relationship is that companies with a production motive must cover the costs of training (to the greatest extent these are the wages of apprentices) during the training period through the productive use of learners. This is done by using learners for those activities that are otherwise performed by unskilled or skilled workers. Due to the relatively lower wages of unskilled workers, companies save on costs (substitution of labour by apprentices). If, on the other hand, a training company invests in the training of future skilled workers, then depending on the amount of the investment, it can usually only be expected that costs will be compensated for after training has taken place (for example, through savings in recruitment costs) (Schönfeld et al. 2010, 14–15).

Following Rauner (2007), a connection may be established between the economics of education and the pedagogical perspective at the abstract level. Learners being integrated into the productive work process creates the conditions for experience-based learning, involvement in a community of practice, and professional identity development, which cannot succeed in this way in non-productive forms (e.g. training firms,

simulations, apprenticeship workshops). However, learning potential depends on the quality of work tasks. Regular, repetitive work tasks (unskilled/semi-skilled work) have a significantly lower learning potential than challenging work tasks (skilled work), through which learners can develop.

Three questions for empirical analysis emerge from this brief discussion of the schemes of apprenticeship:

- Which scheme of apprenticeship is implemented in Austrian companies?
- Is there any empirical relationship between the concrete implementation of vocational learning (how) and the training motives of a company (why)?
- Is there any empirical relationship between a learning-enhancing work design and the scheme of apprenticeship?

Method

Data

For the following empirical investigation of the forms of organisation in Austrian apprenticeship training, two databases are used for secondary analysis. The research design is to be understood as explorative, since two independent surveys are included, which initially followed different research interests and were also not conducted at the same time. However, comparable dimensions are asked in both surveys, which are to be examined against the background of the questions of 'why' and 'how' raised here.

First, we utilised a data set from a survey of training-active companies with the aim of surveying costs and returns (Schlögl and Mayerl 2016). The data set comprises a sample size of 581 training-active companies that train in at least one of the 20 most common occupations. The survey was conducted nationwide in 2015 in the form of an online survey. The questionnaire administered for this purpose was also deployed in cost-benefit surveys in Switzerland (Strupler and Wolter 2012) and Germany (Schönfeld et al. 2010). Training companies of all sizes, in central sectors and in all federal states, were surveyed.

Second, one data set was obtained from the framework of the Third Austrian Apprenticeship Monitor (Lachmayr and Mayerl 2019). Of the total sample of 5253 apprentices, 3206 who were in their last year of training were selected for analysis. The nationwide online survey was administered from September 2018 through May 2019.

So, it is possible to examine the object of research, the organisational form of vocational learning, from the different perspectives of the two central actors: learners and training companies.

Indicators

Both surveys contain almost identical questions that relate to the organisational form of vocational learning. In each case, it was inquired about how training times are distributed between work-integrated forms of learning (two levels: semi-skilled/unskilled workers and skilled workers) and company-based but non-productive forms of learning.

The concrete emphasis of the questions for learners is clear in the following wording: 'How are times distributed among the following types of activities?' Respondents could answer with one of the following categories: *simpler activities*, which can normally be done by a semi-skilled or unskilled worker; *more difficult activities*, which must normally be done by a skilled worker; and *other times*, that is, when there are no products or services that can be used by the company (e.g. exercises for training). The learners were asked to indicate the time distribution retrospectively for each apprenticeship year. This was supplemented by a further question: 'In the case of difficult activities that would normally (have to) be performed by a skilled worker, assume the performance of a skilled worker to be 100 per cent. What percentage of this did you perform in comparison?' For this, respondents were asked to assess each apprenticeship year.

The survey of training companies used an analogous wording. In contrast to the survey of learners, the assessment was not of individuals but was an average of all learners in the training company by the reference date (1 October 2014) and in the respective training occupation selected. A direct comparison is therefore not methodologically permissible; rather, the analysis is limited to an explorative approach to roughly work out patterns of organisational forms of vocational learning.

Considering the complexity of vocational learning, this indicator can only represent organisational forms or types of vocational learning at a high level of abstraction, as Rauner (2007) noted. However, this level of abstraction allows analysis to be performed at the system level. Another strength is that this approach is internationally compatible with relevant comparative analyses of apprenticeship schemes at the level of company implementation (Dionisius et al. 2008; Moretti et al. 2019).

Results

Relation of forms of vocational learning

The rough subtypes queried with regard to the organisation of vocational learning at the company level show fairly comparable pictures of the distribution for both stakeholder groups (learners and companies), which suggests robust findings. The somewhat divergent assessments of the groups only gradually influence the magnitude and picture of changes over the duration of training.

According to the results, in the first half of the training period (the first two years), vocational learning occurs predominantly at the requirement level of semi-skilled and unskilled workers. Only in the second part of the training period does the proportion of work-integrated forms of learning at the level of skilled workers increase significantly. According to information from the training companies, the proportion of forms of learning that are not directly work-integrated is declining; for learners, however, it remains at a stable level throughout the entire training period. The development of performance level during the training period reflects the level achieved in comparison to the competence of skilled workers. The self-assessment of the learners is at a somewhat higher level than the assessment of the training companies, particularly at the beginning of the training. It is noteworthy that on average about three quarters of the competence of an average skilled worker is achieved by the end of the training period. This indicates that the development of full competence to act is not yet completed by the end of the training period

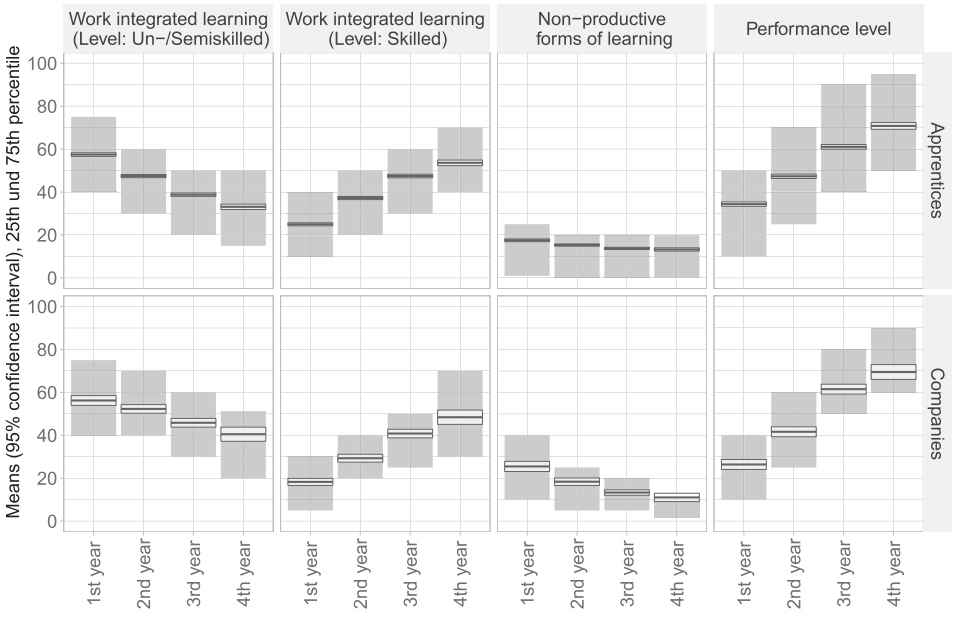

Figure 1. Shares with regard to the extent of the organisation of vocational learning in the training company (by forms and training year). Sources: Third Austrian Apprenticeship Monitor (apprentices) (Lachmayr and Mayerl 2019), Company survey 2015/16 (Schlögl and Mayerl 2016). Authors' calculations.

Notes: year = training year. The mean proportions of the organisational forms of vocational learning (simple activities, difficult activities, other periods) add up to 100 per cent per apprenticeship year.

and that further learning is required after the end of training and the change of status to skilled worker. The overall picture of the organisational form of vocational learning in apprenticeship training can be described as a predominantly work-integrated model, which occurs primarily at a low requirement level (high proportion of activities carried out at a semi-skilled/unskilled level of work, see Figure 1). This is also reflected in the level of performance, which develops at a significantly lower level than it does in Switzerland or Germany (Schlögl and Mayerl 2017). The high variance of the results (see Figure 1) further shows that the companies have leeway in the design of vocational learning, which is also being used. Although the comparison of the mean values revealed differences (e.g. by company size or training occupation groups), no systematic patterns emerge. The organisational forms of in-company learning are likely to be less constituted by general sector-specific conditions and more dependent on individual company conditions such as training motive and work organisation. This is empirically investigated in the next sub-chapter.

Training motives and form of organisation

A set of items was used in the company survey to ascertain reasons why companies train learners within the framework of apprenticeship training. In addition to the two core elements of production motive (utilisation of the productive performance of learners) and investment motive (training to cover the company's own need for skilled

workers), the literature cites the screening motive (training as screening for future employees), the reputation motive (higher reputation vis-à-vis customers, partners, and suppliers), and training out of social responsibility as key training motives (Schönfeld et al. 2010, 14–15). In order to extract the core motives and make them usable for analysis, indicators for various training motives were calculated on the basis of an explorative factor analysis. The latent factors extracted from these were named following Schönfeld et al. (2010, 14–15). The indicators covering the need for skilled workers (two items, e.g. gaining skilled workers as there is a shortage of qualified personnel in the labour market; Cronbach's alpha[1] = 0.68), saving costs (three items, e.g. saving unskilled and semi-skilled labour by using apprentices during training; Cronbach's alpha = 0.79), and screening (three items, e.g. being able to select 'the best' when taking on apprentices; Cronbach's alpha = 0.75). The values of the indicators range from 1 (completely unimportant) to 5 (very important). The indicator covering the need for skilled workers refers to an investment-oriented strategy, while the indicator saving costs refers to a production-oriented strategy. Screening motives are to be classified as strategic hybrids.

For evaluation, several linear regression analyses were conducted, whereby the time shares of the respective forms of organisation (work-integrated forms of learning at two levels, non-production-oriented forms of learning) as well as the performance level were defined as dependent variables. The respective indicators on the training motives and further control variables (apprenticeship occupational group, sector, and company size) were defined as independent variables. For reasons of clarity, the regression analyses were restricted to the third year of training. This is of particular interest as it relates to the final phase of in-company training.

The results of the regression models are shown in Table 1. A key finding is that those companies that see apprenticeship training primarily as an investment to meet future skilled labour needs engage learners to a significantly greater extent via work-integrated learning at the skilled-worker level (M1.2). Conversely, the share of work-integrated learning at the basic activity level decreases for enterprises with a strong investment motive (M1.1). The trend (at a non-significant level) shows that training-active enterprises with production-oriented motives (cost-saving) organise vocational learning less at the skilled-worker level (M1.2) and more at the semi-skilled/unskilled labour level (M1.1). Training-active enterprises with a screening motive lie in between: they have a slightly higher share of work-integrated forms of learning at a simple level (M1.1) but also a slightly higher share of work-integrated forms of learning at a higher level (M1.2).

Regarding the share of non-production-oriented forms of learning, there are no significant differences between the training motives (M1.3), but they tend to point back to the expected signs: investment-oriented enterprises have a slightly higher share of non-production-oriented forms of learning, and production-oriented enterprises and enterprises with a screening motive tend to have lower shares. However, it should be noted that the share of non-productive forms of learning decrease anyway by the end of training (see Table 1).

There is a clear correlation between the organisational forms of vocational learning and the average performance level of the learners. There is a positive correlation between performance level and work-integrated learning at the skilled-worker level (M1.2). There is a negative correlation between performance level and share of work-integrated learning at the level of simple activities (M1.1).

Table 1. Regression models – relationship between in-company training motives and the organisational form of vocational learning (non-standardised coefficients).

Predictors	Share work integrated learning (Level: Un-/Semi-skilled) (M1.1)		Share Work integrated Learning (Level: Skilled) (M1.2)		Share Non-productive forms of learning (M1.3)		Performance level (M2)	
	Intercept (CI)	*p*	Intercept (CI)	*p*	Intercept (CI)	*p*	Intercept (CI)	*p*
(Intercept)	44.32 (38.44–50.20)	**<0.001**	37.89 (32.31–43.46)	**<0.001**	17.79 (14.11–21.48)	**<0.001**	54.19 (47.58–60.80)	**<0.001**
Training motives (indicators)								
Covering need for skilled workers (centred)	−5.00 (−8.61 to −1.39)	**0.007**	4.47 (1.05–7.89)	**0.011**	0.53 (−1.74–2.79)	0.648	4.56 (0.50–8.62)	**0.028**
Saving costs (centred)	1.87 (−0.76–4.49)	0.163	−1.25 (−3.73–1.24)	0.324	−0.62 (−2.26–1.02)	0.460	−2.39 (−5.34–0.57)	0.113
Screening (centred)	1.16 (−2.35–4.67)	0.517	0.21 (−3.11–3.54)	0.900	−1.37 (−3.57–0.83)	0.222	2.95 (−1.01–6.91)	0.143
Performance level (centred)	−0.16 (−0.24 to −0.07)	**<0.001**	0.29 (0.21–0.37)	**<0.001**	−0.13 (−0.19 to −0.08)	**<0.001**	–	–
Groups of apprenticeship occupations (Reference: Metal/Vehicles)								
Construction/Building services	7.33 (0.50–14.15)	**0.035**	−0.68 (−7.14–5.78)	0.836	−6.64 (−10.92 to −2.37)	**0.002**	3.54 (−4.17–11.25)	0.367
Office/Administration	−4.79 (−14.26–4.67)	0.320	13.47 (4.50–22.44)	**0.003**	−8.68 (−14.61 to −2.75)	**0.004**	15.88 (5.29–26.47)	**0.003**
Electrical engineering	3.38 (−3.27–10.03)	0.319	2.20 (−4.10–8.50)	0.493	−5.58 (−9.74 to −1.41)	**0.009**	0.16 (−7.36–7.68)	0.967
Trade	3.44 (−6.83–13.71)	0.511	3.29 (−6.43–13.02)	0.506	−6.73 (−13.17 to −0.30)	**0.040**	3.72 (−7.89–15.33)	0.529
Wood/Paper	−6.42 (−15.57–2.73)	0.169	5.51 (−3.16–14.18)	0.212	0.91 (−4.83–6.64)	0.755	9.49 (−0.82–19.80)	0.071
Information/Communication	3.75 (−17.15–24.66)	0.724	0.77 (−19.03–20.58)	0.939	−4.53 (−17.63–8.57)	0.497	8.37 (−15.26–32.00)	0.486
Body care	−8.84 (−20.35–2.67)	0.132	11.07 (0.16–21.97)	**0.047**	−2.23 (−9.44–4.99)	0.544	8.31 (−4.69–21.30)	0.210
Tourism/Gastronomy	2.44 (−12.27–17.15)	0.744	−0.90 (−14.83–13.04)	0.899	−1.54 (−10.76–7.68)	0.742	−1.48 (−18.11–15.16)	0.862
Sector (Reference: Trade and Craft)								
Industry	−10.15 (−18.15 to −2.15)	**0.013**	7.51 (−0.07–15.09)	0.052	2.64 (−2.37–7.65)	0.301	0.09 (−8.96–9.14)	0.984
Trade	−3.51 (−12.77–5.75)	0.457	−2.80 (−11.57–5.97)	0.530	6.31 (0.51–12.11)	**0.033**	9.90 (−0.52–20.33)	0.063
Transportation, Traffic	5.80 (−16.30–27.89)	0.606	−16.58 (−37.51–4.35)	0.120	10.79 (−3.06–24.63)	0.126	−14.50 (−39.45–10.45)	0.254
Tourism, Leisure	−2.41 (−16.48–11.66)	0.737	3.02 (−10.31–16.35)	0.656	−0.61 (−9.43–8.20)	0.892	12.00 (−3.87–27.87)	0.138
Information, Consulting	−4.07 (−20.69–12.54)	0.630	5.27 (−10.47–21.01)	0.511	−1.20 (−11.61–9.21)	0.821	−10.12 (−28.88–8.65)	0.290
Company Size (Reference: 0–9 employees)								
10–49	3.26 (−2.07–8.58)	0.230	−0.51 (−5.55–4.54)	0.844	−2.75 (−6.09–0.59)	0.106	−1.52 (−7.55–4.50)	0.619
50–249	2.92 (−3.53–9.38)	0.373	−1.15 (−7.26–4.97)	0.712	−1.78 (−5.82–2.27)	0.388	6.57 (−0.70–13.84)	0.076
More than 250	4.14 (−5.87–14.14)	0.417	−1.07 (−10.55–8.40)	0.824	−3.06 (−9.33–3.21)	0.338	1.00 (−10.32–12.31)	0.862
Observations	415		415		415		415	
R^2 / R^2 adjusted	0.130 / 0.086		0.203 / 0.162		0.134 / 0.090		0.123 / 0.080	

Source: Company survey 2015/16 (documented in Schlögl and Mayerl 2016). Authors' calculations. Notes: (centred) = variable was mean-centred.

There are also interesting differences between sectors in terms of the forms of organisation of vocational learning. Compared to the reference group trade and crafts, in the third year of training, vocational learning in industry is organised to a significantly lesser extent according to the requirement level of simple activities. The size of the training company has no influence on the form of organisation.

The perspective of the learners

In this section, the perspective is shifted to the learners. The section examines the extent of the relation between organisational form of vocational learning and working conditions in in-company training that are conducive to learning.

The Third Austrian Apprenticeship Monitor includes a set of items that refers to various dimensions of a working environment that are conducive to learning. With the help of an explorative factor analysis, three indicators were created, the content of which refers to different dimensions of working conditions appropriate to the context of work-integrated learning: reflexivity (four items, e.g. 'It is regularly discussed in the company how I am coping with the training'; Cronbach's alpha = 0.80), embeddedness in expert community (two items, e.g. 'I feel fully accepted in the company as a colleague'; Cronbach's alpha = 0.79), and completeness of work actions (three items, e.g. 'I not only perform individual work steps but am also fully involved in larger work processes'; Cronbach's alpha = 0.79). The value range of the indicators is 1 (disagree) to 5 (agree).

Analogous to the methodology of the previous analysis, several linear regression analyses were conducted. The three indicators on working conditions conducive to learning and the level of performance were inserted as independent variables. Additional control variables like gender, language, occupation in which a learner is trained, company sector, and company size were included in the model. This analysis was also limited to the third year of training.

The central results of the linear regression models in Table 2 are consistent with the theoretical considerations presented above, though with individual deviations. The agreement with the idea of complete work acts is significantly related to the implemented organisational forms of vocational learning. Complete work acts can only be realised insofar as they are completed as work-integrated forms of learning at the level of a skilled worker (M3.2); this is not the case for activities performed at the level of semi-skilled/unskilled workers (M3.1). Reflective forms of vocational learning, on the other hand, are found primarily in non-productive forms of learning (M3.3) and significantly less in work-integrated learning at skilled-worker level (M3.2). This leads to the conclusion that work-integrated learning at the skilled-worker level is not, per se, to be equated with reflective vocational learning.

The result is somewhat surprising with regard to the effect of indicator involvement in the expert community on the organisational forms of vocational learning. The degree of social involvement is not related to the organisational form of learning in which the trainees are involved (M3.1–M3.3). Furthermore, there is a negative correlation between the level of performance and indicator involvement in the expert community (M4).

Analogous to the aforementioned results (Table 1), a highly significant correlation between learners' performance level (according to self-assessment) and the organisational form of vocational learning can also be determined from the learners' perspective.

Table 2. Regression models – relationship between characteristics of a working environment conducive to learning and the organisational form of vocational learning (non-standardised coefficients).

Predictors	Share work integrated learning (Level: Un-/Semi-skilled) (M3.1)		Share Work integrated Learning (Level: Skilled) (M3.2)		Share Non-productive forms of learning (M3.3)		Performance level (M4)	
(Intercept)	52.06 (49.03–55.10)	**<0.001**	33.42 (30.35–36.48)	**<0.001**	14.52 (12.52–16.52)	**<0.001**	55.7 (51.48–59.91)	**<0.001**
Indicators Quality of Vocational Learning								
Reflexivity (centred)	0.11 (−1.08–1.31)	0.851	−2.86 (−4.06 to −1.65)	**<0.001**	2.74 (1.95–3.53)	**<0.001**	−3.61 (−5.29 to −1.93)	**<0.001**
Involvement of expert community (centred)	0.42 (−0.69–1.53)	0.457	−0.42 (−1.54–0.69)	0.456	0 (−0.73–0.73)	0.991	−2.53 (−4.04 to −1.01)	**0.001**
Completeness of work acts (centred)	−7.17 (−8.45 to −5.90)	**<0.001**	7.49 (6.21–8.78)	**<0.001**	−0.32 (−1.16–0.52)	0.455	8.4 (6.62–10.18)	**<0.001**
Performance level (centred)	−0.15 (−0.17 to −0.12)	**<0.001**	0.19 (0.17–0.22)	**<0.001**	−0.05 (−0.06 to −0.03)	**<0.001**	–	–
Gender (Reference: Male)								
Female	−2.05 (−4.09 to −0.01)	**0.049**	0.77 (−1.29–2.83)	0.461	1.28 (−0.07–2.62)	0.063	−5.11 (−7.89 to −2.33)	**<0.001**
Household language (Reference: German)								
Language other than German	−4.53 (−7.01 to −2.06)	**<0.001**	1.75 (−0.75–4.25)	0.17	2.78 (1.15–4.42)	**0.001**	0.44 (−2.95–3.82)	0.8
Groups of apprenticeship occupations (Reference: Metal Technology/Mechanical Engineering)								
Construction, Architecture, Building Services Engineering	−4.51 (−7.71 to −1.32)	**0.006**	5.78 (2.56–9.00)	**<0.001**	−1.27 (−3.38–0.84)	0.237	4.22 (−0.12–8.56)	0.056
Office, Commerce, Finance	−0.84 (−4.22–2.54)	0.624	3.23 (−0.18–6.63)	0.064	−2.38 (−4.61 to −0.15)	**0.036**	4.89 (0.28–9.50)	**0.038**
Electrical Engineering, Electronics	1.56 (−1.88–5.01)	0.374	−1.05 (−4.53–2.42)	0.552	−0.51 (−2.78–1.76)	0.66	−5.79 (−10.46 to −1.12)	**0.015**
Wood, Paper, Glass, Ceramics	−5.99 (−10.65 to −1.34)	**0.012**	4.31 (−0.38–9.01)	0.072	1.68 (−1.39–4.75)	0.283	4.1 (−2.20–10.39)	0.202
Body Care, Beauty	−1.93 (−5.62–1.77)	0.307	−2.99 (−6.72–0.74)	0.116	4.91 (2.48–7.35)	**<0.001**	−3 (−8.03–2.04)	0.243
Law, Security, Administration	1.07 (−5.01–7.16)	0.729	2.88 (−3.25–9.02)	0.357	−3.96 (−7.97–0.06)	0.053	2.24 (−6.07–10.55)	0.598
Tourism, Gastronomy, Hotel industry	−6.82 (−13.27 to −0.37)	**0.038**	5.52 (−0.98–12.02)	0.096	1.3 (−2.96–5.55)	0.551	5.2 (−3.61–14.01)	0.247
Other Groups	−2.97 (−5.87 to −0.08)	**0.044**	3.38 (0.46–6.29)	**0.023**	−0.4 (−2.31–1.51)	0.681	6.61 (2.69–10.53)	**0.001**
Sector (Reference: Trade and Craft)								
Industry	−1.82 (−4.39–0.75)	0.165	0.31 (−2.28–2.90)	0.814	1.51 (−0.19–3.21)	0.081	1.9 (−1.59–5.39)	0.286
Trade	−0.67 (−3.81–2.48)	0.678	−1.01 (−4.18–2.17)	0.534	1.67 (−0.40–3.75)	0.114	0.74 (−3.54–5.02)	0.735
Bank & Insurance	−3.57 (−12.86–5.72)	0.451	1.82 (−7.55–11.18)	0.704	1.75 (−4.37–7.88)	0.575	−10.94 (−23.51–1.63)	0.088
Transport & Traffic	−2.38 (−7.63–2.87)	0.375	1.59 (−3.71–6.88)	0.557	0.79 (−2.67–4.25)	0.655	−2.71 (−9.86–4.44)	0.457
Tourismus & Leisure	4.96 (−1.23–11.16)	0.116	−2.67 (−8.92–3.58)	0.403	−2.3 (−6.38–1.79)	0.271	7.89 (−0.55–16.32)	0.067
Information & Consulting	−9.77 (−22.23–2.68)	0.124	9 (−3.56–21.56)	0.16	0.77 (−7.44–8.99)	0.854	2.58 (−14.27–19.43)	0.764
Other (z.B. public service)	−0.35 (−4.60–3.89)	0.871	−1.06 (−5.34–3.23)	0.629	1.41 (−1.39–4.21)	0.325	−3.6 (−9.41–2.21)	0.224
Company size (Reference: 0–9 employees)								
10–49 employees	−2.27 (−4.71–0.16)	0.068	1.25 (−1.20–3.71)	0.318	1.02 (−0.59–2.63)	0.213	−1.03 (−4.34–2.29)	0.544
50–249 employees	−1.26 (−3.92–1.39)	0.351	0.37 (−2.30–3.05)	0.784	0.89 (−0.86–2.64)	0.32	0.37 (−3.24–3.98)	0.839
More than 250 employees	−0.5 (−3.04–2.04)	0.698	−1.33 (−3.89–1.23)	0.308	1.83 (0.16–3.51)	**0.032**	1.01 (−2.45–4.47)	0.567
Item Confidence in professional future							2.46 (1.17–3.75)	**<0.001**
Observations	2,969		2,969		2,969		2,942	
R^2 / adjusted R^2	0.134 / 0.127		0.151 / 0.144		0.064 / 0.056		0.079 / 0.071	

Source: Company survey 2015/16 (Schlögl and Mayerl 2016). Authors' calculations. Notes: (centred) = variable was mean-centred. Item Confidence Vocational Education: 'I am very confident about my future career'. Categories: 1 = disagree to 5 = agree. This table can be interpreted in the same way as Table 1.

The development of vocational action competence (indicated by the level of performance) thus occurs increasingly in work-integrated forms of learning at the skilled-worker level (M3.2). The degree of achievement is high if it is also determined that work-integrated learning occurs through complete vocational actions (M4). A high level in the development of vocational action competence also leads to an optimistic assessment of the occupational future: the higher the degree of achievement (i.e. the vocational competence developed in the course of vocational learning), the better the learners feel prepared for their occupational future.

Regarding company-related control variables (apprenticeship occupational group, branch of industry, and apprenticeship company size), only a few differences can be found with regard to the organisational forms of company-based learning. However, these are not reflected analogously in the analysis of the company survey. This could be due to the different samples. Another explanation could be that vocational learning is very much realised at the company level and group-specific characteristics (sector, apprenticeship occupation groups) have little influence on concrete company organisational forms. It should be pointed out again that the size of the company cannot explain the variance of the forms of organisation.

Discussion

The reported results provide a variety of indications in different perspectives. In addition to findings on overarching but mostly implicit training strategies, they provide impetus for in-depth debate on the in-company practice of VET as well as an impetus for research and theorising.

Thus, the empirical findings unsurprisingly show that dual training in Austria is largely realised through work-integrated forms of learning. However, as the international comparison shows, this occurs to a relatively greater extent with activities that require unskilled workers and comparatively less frequently with activities typical of skilled workers. However, there is a high variance in *how* individual companies implement work-integrated learning. One factor that helps to clarify this variance is the training motive of the enterprise. Enterprises that indicate investment-oriented training motives combine learning and work at the skilled-worker level to a greater extent than enterprises with production-oriented training motives.

This finding is highly relevant insofar as research attests special learning potentials to precisely those forms of workplace learning that prepare for less routinised tasks and situations, which in turn can be seen as a description of the requirements of the skilled worker level. Our results show that the chances for in-company learning discussed in the scientific literature is suboptimally utilised in concretely designed dual training in Austria. Rather, current training practice can be described as a primarily employment-related transfer system from compulsory schooling to the labour market (Lassnigg 2017). The primary goal of the actors involved in dual training is thus the successful labour market integration of young people, and vocational learning is shown to be of secondary importance. Despite the fact that actively enabling the social participation of as many young people as possible is a welcome goal, in future, the challenges that arise for dual training should be taken into account and actively managed without, ideally, detracting from the achievement of the first goal. In this respect, the need to be

mindful of how we talk about professional learning processes and what metaphorical images we use for learning (Sfard 1998) can be pointed out again. And, that it should not be primarily about the primacy of skill acquisition or participation. Rather, it would be worthwhile to address both objectives to the greatest possible extent and thus to think of social and labour market policy as well as qualification objectives and learning as closely linked.

With regard to in-company training practice, however, there is at the same time a clear information deficit and transparency problem. This applies to policymakers but also to young people and their parents who are looking for high-quality training facilities. What is needed therefore are suitable measures for systematically and continuously improving the quality of vocational learning of the in-company part of training so that the selection of a training company does not become a game of chance. A central challenge here is how to create framework conditions that ensure high quality for all learners without companies increasingly withdrawing from dual training due to increasing standardisation or bureaucratisation.

The discrepancies between the diversity found in company learning processes and the fulfilment of the normative, cross-company requirements of the training regulations should be dealt with through practice-oriented service materials and action-oriented instruments. To this end, approaches such as service materials for in-company training practice, further training of in-company training personnel, binding (self-)evaluation of training quality by the companies themselves, and much more have been discussed and in some cases already piloted in Austria in recent years. The research presented here offers an approach based on the effectiveness of the rapid introduction to skilled work in terms of the extent to which learning environments that are rich in requirements, and thus more effective learning occasions, succeed in the company context.

For research and theory, on the other hand, individual findings seem to be interesting, three of which are singled out here. The first is the fact that reflexivity, which is becoming increasingly important for modern occupational activity, requires special attention for vocational training that is strongly based on work-integrated learning processes or that special time windows or learning locations have to be taken into account. If one takes the learners' feedback seriously, this important meta-competence does not seem to be developed automatically in the company work process. So, vocational and in-company pedagogical research on the effective teaching and safeguarding of corresponding competences would be important. Likewise, corresponding indications are needed as to the extent to which these could be promoted in a special way through appropriate in-company learning tasks or whether they must in any case be detached from the actual work process in order to be worked on effectively. Questions arise in this context. If one accounts for the rapid transformations of economy and society, does this apply only to apprenticeship? Might it also apply to initial in-company training, continuing training, or even human resource development as a whole?

Second, in connection with this, it becomes apparent that there is also little reliable knowledge about those learning and educational processes that do not occur directly in the work process, but nevertheless do in the company. Although these supposedly only account for 12–23%, they are of great importance because companies, if they act as rational actors, must regard these non-productive times as relevant and critical to success. In this context, qualitative research approaches would probably be the most

appropriate way to trace rationales and concrete practices, examine their relation to work processes and school-based learning, and identify their contribution to the overall success of an apprenticeship.

Third, an unexpected result should be noted, namely that the assessment of an early appreciative integration into the respective community of practice does not necessarily lead to a faster increase in the level of performance when measured in terms of the competence level of a skilled worker. Context-specific studies would be important for answering the following question: Does the community-of-practice model provide a comprehensive explanation for dual training as an initial training model or are there other significant variables, such as very specific circumstances related to occupation, working conditions, form of social interaction, and hierarchy of a work organisation, that must be accounted for.

Overall, the still rather rough data and overview presented in this study lead to many further substantial questions that are not automatically solved by the normative regulation of company-based training.

Note

1. Cronbach's alpha is a measure of the internal consistency of a scale and denotes the extent to which the items or questions on a scale are related or independent of one another. In simplified terms, the value can be interpreted in such a way that the closer it comes to 1, the higher the reliability of an instrument or test. Values from 0.7 are considered acceptable and above that as good.

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ORCID

Peter Schlögl http://orcid.org/0000-0001-6944-8573

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