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Differences in Perception Matter – How Differences in the Perception of Training Quality of Trainees and Trainers Affect Drop-Out in VET

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Abstract

The dual system of vocational education and training (VET) and its quality have recently been receiving scientific attention, partly due to high drop-out rates and to politically-motivated efforts to increase participation in the system (Le Mouillour, 2018). However, it remains controversial as to how quality within training companies should be measured, and from whose perspective, and how the quality of training affects drop-out. Empirical studies mostly target the quality perceptions of trainees or of trainers in isolation. The extent to which output factors such as drop-out rates are influenced by variations in perceptions of quality between both these parties has to this point not been tested. The object of the present study was to present a novel bilateral approach to assessing training quality. For this reason, the effects on drop-out intention of differences in the perception of in-company training quality (incongruences) between trainees and trainers from the same company were examined. An online survey was conducted involving 311 commercial trainees and training officers from 30 German companies. A framework model of workplace learning (Tynjälä, *Vocations and Learning, 6*(1), 11–36, 2013) and a short questionnaire "VET-LQI" (Böhn and Deutscher, *Zeitschrift für pädagogische Psychologie: ZfPP, 33*, 49–70, 2020) served as the theoretical basis and test instrument respectively. Responses from trainees were matched to those of their corresponding trainers, in order to determine possible differences for every item and scale. Following a weighting method regarding the absolute rating level, 15 input- and process-quality factors of divergence, so called "difference accounting multi-perspective scores" were used as independent variables in multiple regression analyses. The results show that differences in perception of quality not only have a significant effect on

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Highlights for Review

- A novel bilateral approach to analyse training quality and outcomes is presented
- Negative differences in perception integrate perspectives of trainees and their respective trainers
- Data from an online survey with 311 trainees and their trainers (30 companies)
- Effects of training quality on drop-out intentions vary depending on the approach
- Bilateral approach shows significantly greater explanatory power than unilateral view

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drop-out intentions, but also explain drop-out intentions more generally, and with a higher predictive power than the conventional method of merely focusing on the quality perceptions of trainees (adjusted $R^2 = .439 > .333$).

Keywords Training quality · Vocational education and training · Multiple perspectives · Difference score · Drop-out intention

In-company training is often referred to as a crucial component of vocational education and training (VET) that contributes to low youth unemployment rates, as the entry into employment is facilitated. Moreover, competitive advantages for companies and industries are provided by securing a practically highly qualified workforce (Dornmayr 2016; Hanushek 2012; EU 2018; OECD 2019). In recent decades, many countries[1] around the globe have adopted a dual vocational education and training structure by combining company-based training programs provided by the private sector, with a school-based component, usually provided by the public sector, leading to qualifications in nationally recognized occupations. However, despite their perceived importance for education and economic policy, VET actors internationally struggle with issues of quality assurance and quality improvement (Le Mouillour 2017, 2018). Therefore, training quality must be taken seriously in order to achieve the claimed advantages of such systems. For example, in Germany, decreasing enrolment rates and increasing drop-out rates (26%) are becoming a concern (Bundesinstitut für Berufsbildung (BIBB) 2020).[2] Also, governments in Austria (Dornmayr and Löffler 2018), Denmark (Andersen and Helms 2019), France (Centre Inffo 2019), the Netherlands (Smulders et al. 2019), Portugal (DGERT 2019) and Sweden (Skolverket ReferNet Sweden 2019) aim to strengthen VET's attractiveness for young people, in order to reduce the number of early leavers from VET and to improve the labour market situation. These efforts could be supported by an increase in the quality of dual educational programmes (Gow et al. 2008).

However, there are two major scientific obstacles to VET quality research, which are – as we will show – interrelated: First, findings on workplace training quality differ widely due to the diverse perspectives on and ideas about quality, which reduces the comparability of studies (Tynjälä 2013; Ebbinghaus 2016). While numerous studies focused on unilateral perception of training quality are available, "multi-perspective" explorations that interrelate quality perceptions by different actors are rare (Ebbinghaus et al. 2011, p. 203 ff.). This is problematic, since the few existing multi-perspective explorations show that the expectations and perceptions of training quality diverge considerably between trainees and trainers (Ebbinghaus et al. 2010; Griffin 2017; Filliettaz 2010; Negrini et al. 2016; van der Sluis et al. 2014). Second, unilateral studies looking into training quality usually find no or rather small effect sizes with regard to the influence of most quality aspects in the

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[1] E.g. Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, the Netherlands, Portugal, Sweden, Switzerland.

[2] Drop-out rates vary widely across the numerous training occupations. This is exemplified with the occupations included in this study in Appendix Table 6.

process category, on vocational quality outputs (e.g. vocational competence, vocational identity, vocational drop-out, etc.). This could either be the result of adopting an incomplete measurement approach (leaving out important factors of variance explained) or may suggest that quality as a concept is likely to be less of an explanatory factor for successful VETs than theoretical models and political agendas tend to suggest.

We believe that these two conundrums of VET quality research (the paucity of multi-perspective insights and the unexpectedly low effect-sizes) are intertwined, in the sense that the integration of multiple perspectives allows for a more full explanatory approach to illuminating the genesis of VET output categories (e.g. drop-outs). In support of this assumption, we wished to explore how the different perceptions of company-based training held by trainees and trainers, impact the explanatory power of output factors. For this study, we focused on the output category drop-out, as measured by drop-out intention. Data from a conducted online survey, involving 311 commercial trainees and training officers from 30 German companies, served as a basis.

In the following sections, the challenges around training quality are briefly discussed, before the underlying quality framework for the study (Tynjälä 2013; Böhn and Deutscher 2019) is presented. Subsequently, our methodological approach is introduced: one that integrates the different perspectives on in-company training between commercial trainees and trainers, in order to objectify experiences to a certain extent. We then analyse the impact on drop-out intention through regression analysis and compare the results with those results of a mono-perspective approach (considering only the trainees' perceptions). We finally report the results and discuss the findings, also considering the respective limitations of the general study design.

Approaches to Training Quality in VET

Theoretical Basis of In-Company Training Quality Assessment

Two challenges complicate the assessment of training quality: The first challenge is to define what training quality exactly is. In spite of a longstanding research tradition, there is still no generally accepted definition of VET quality, nor a catalogue of criteria that could be applied to determine the actual quality of training (Ebbinghaus 2009). Secondly, there are various actors involved in company-based VET (e.g. trainees, trainers, program organizers, official regulators). In research studies to date, the "mono-perspective" approach is most frequently applied, where only one group of VET actors is considered, and where trainees are by far the most common subject of investigation (see Böhn & Deutscher 2019). However, there are also numerous studies focused on the perceptions held by training companies or trainers (e.g. Cooney and Long 2008; Jansen and Pineda-Herrero 2019; Kirpal and Wittig 2009; NCVER 2001; Wilson 2019). However, multi-perspective approaches to training quality that include both trainees and trainers are still rare (e.g. Rausch and Schley 2011; Rönnlund et al. 2019; Wisshak and Hochholdinger 2018). Several of these do underline that trainees and trainers perceive training quality differently (e.g.

Cully and Curtain 2001; Ebbinghaus et al. 2010; Griffin 2017; Negrini et al. 2016; van der Sluis et al. 2014; Walker et al. 2012; Wandeler et al. 2011). Differences were found regarding numerous quality aspects, e.g. feedback and monitoring (Cully and Curtain 2001; Ebbinghaus et al. 2010; Negrini et al. 2016), Self-regulation (Negrini et al. 2016; Wandeler et al. 2011), variety of experiences, time for training (Walker et al. 2012) and learning material (Ebbinghaus et al. 2010).[3] Therefore, a multi-perspective approach that interrelates the perceptions by trainees and trainers, is needed in order to give a more coherent picture of VET training quality.

In contrast to most research, both actors – trainees and trainers – are addressed equally in this study. For this reason, a broad and perspective-independent definition of VET quality and quality framework model was taken as the basis. In this respect, quality is generally defined as the individual perception of characteristics of vocational training that are conducive to certain outcomes (Klotz et al. 2017). Ebbinghaus et al. (2010) have shown that the quality demands of both actors (trainers and trainees) are largely identical. Thus, a multi-perspective comparison of both perceptions seems plausible, as they basically value similar dimensions of quality. A framework of VET quality that reflects broad consensus in the workplace learning community, using a 'three pillar approach' (e.g. Seyfried et al. 2000; Visser 1994), can be found in the adapted 3-P Model of Tynjälä (2013) which, following Biggs (1999), distinguishes presage, process and product factors. This quality framework was further operationalized by Böhn and Deutscher (2019) through a qualitative meta-synthesis of existing measurement instruments for VET quality aspects (see Fig. 1) and was condensed into a survey instrument (VET-learning quality inventory; presented in "Survey Instrument" Section). Therefore, the categories represent commonly used quality aspects in the research literature but shall not be seen as exhaustive, since further criteria could plausibly be involved. This means, that the framework by Tynjälä (2013) is predominantly used as a categorization scheme.

As can be seen in Fig. 1, the quality framework comprises a dynamic view of quality. The different quality dimensions are arranged in their chronological order and in causal direction from left to right. However, because of our specific research interest in the effects of differences in perception of in-company training quality, further macro-influences, e.g. the labour market or economic situation, are ignored and only aspects regarding the company are considered. The Input dimension comprises aspects initially provided by companies as well as personal details such as e.g. gender or prior school career (Böhn and Deutscher 2019, p. 65). Input factors on the company side are further subdivided into the areas *Learning Environment* and *Framework*. This latter further distinguishes between *Vocational Training Framework* and *Company Framework*, while *Learning Environment* comprises the aspects *Work Climate, In-company Learning* and *Usefulness of Learning Venue Cooperation.* The centre of the model is formed by the Process dimension, which encompasses the following three areas of quality criteria that only come into effect over the course of training. The first, *Work Tasks,* comprises aspects that define the characteristics of tasks, such as *Overload*, *Variety of Tasks*, *Autonomy*, *Relevance of Tasks*

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[3] As mentioned above, different items and scales were used to measure quality, which reduces comparability.

Training Quality

Input

Process

Output

Learning Environment
- Work Climate
- In-Company Learning
- Learning Venue Cooperation

Framework
- Vocational Training Framework
- Company Framework

Personal Details
- Demographic Factors
- Personal Factors

Personal Data

Work Tasks
- Workload
- Variety of Tasks
- Autonomy
- Relevance of Tasks
- Complexity of Tasks

Social Interaction
- Involvement in Occupational Expert Culture
- Functional Involvement
- Social Involvement

Educational Mediation
- Mentoring
- Curriculum Orientation
- Feedback
- Training Requirements & Ability Level
- Personnel and Instructions

Biography
- Application Process
- Personal Background

Career

Completion and Final Exam

Premature Termination of Contract

Professional Competence

Career Choice

Overall Assessment and Satisfaction

Vocational Identity

Operational Identity

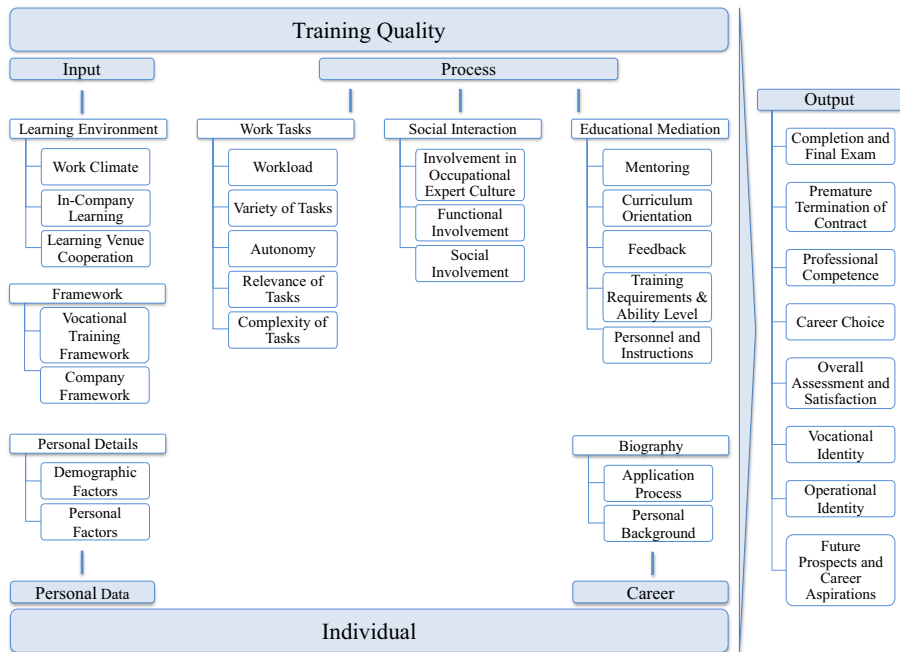Future Prospects and Career Aspirations

Individual

Fig. 1 Operationalisation of training quality (Böhn and Deutscher 2019, p. 66)

and *Complexity of Tasks*. The second area, *Social Interaction*, consists of *Involvement in Occupational Expert Culture*, *Functional Involvement* and *Social Involvement*. The third process area, *Educational Mediation*, comprises the aspects *Mentoring*, *Curriculum Orientation*, *Feedback*, *Training Requirements and Ability Level*, as well as *Personnel and Instructions*. Social Interaction and Educational Mediation both describe the interaction processes between trainees and their company (ibid., p. 65 f.). Finally, the Output dimension reflects the results of all the preceding quality criteria in the short- or long-term effects of training (ibid., p. 67). Therefore, various areas like *Professional Competence*, *Vocational Identity* or *Overall Assessment and Satisfaction* are included. However, this study concentrated on drop-out intentions (a part of *Premature Termination of Contract*) as the main Output aspect.

Within this view, evaluations of training quality are in accordance with Lempert's (1998) interactionist theory, which assumes that the roots of vocational developments lie in the interaction of the individual with its direct environment and other people.[4] Measurement of the environment, of interactional processes and their results relies on the subjective perceptions of different actors (Böhn and Deutscher 2019; Klotz et al. 2017; Tynjälä 2013). Therefore, prevalent training quality is captured through the aggregated perspective of individuals in a specific group of actors.

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[4] Lempert (1998) also includes influences by the surrounding macro-level (e.g. job market, legal regulations). However, due to the interest in differences in perception, this study focuses on the micro-meso-level.

However, against the backdrop of these initially stated challenges in VET, special attention must be paid to potential systematic differences in quality perceptions between both parties, which are still largely unexplored (Negrini et al. 2016, p. 366). Considering these aspects and in line with the interactionist theory (Lempert 1998), it is consequently more plausible that drop-outs, and especially drop-out intentions, evolve from the interaction between an individual and its environment and therefore dependent on multiple subjective perceptions coming together rather than an isolated view.

Negative Deviations in Quality Perceptions

The finding that the existing multi-perspective explorations consistently reveal large divergences in the perceptions of training quality by trainees and trainers, can be interpreted as verification that human observation is a highly unstable, imprecise and biased form of observation that hinders universally acceptable recognition (Beck 1987, p. 181). One way to deal with this issue would be to eliminate human observation from the research process, as suggested by Beck (1987) or at least to substitute personally involved individuals with neutral observers. However, many variables of the construct of training quality are hardly operationalized through clearly observable behaviour (such as e.g. vocational identity). And even if a construct is operationalized carefully by actual behavioural indicators, it would be very costly and possibly also unethical due to privacy reasons to observe a sufficiently large group of learners and trainers in such detail.

Another way of dealing with subjective bias might lie in the perspective-crossing objectivation of subjective perception by the integration of several perspectives. The measurement approach is then of course still subjective (with many of the associated insufficiencies therefore), but could to a certain extent be adjusted for the specific subjective bias of a single focus group. In order to implement a perspective-crossing approach, differences in perceptions between trainees and their trainers are calculated. It is expected that especially negative differences (incongruent perceptions) from trainee to trainer will affect output factors like satisfaction, and even drop-out, while in the case of rather similar evaluations of, for instance "too much overtime", both actors are aware of a problem that should be avoided in training. In such cases a complaining trainee will face a training officer who is of the same opinion and therefore will try to mitigate the trainee's frustration and explain the situation. Trainers' objective would be to prevent a severe conflict and maintain a good relationship by showing the necessary understanding (Rüttinger and Sauer 2016). A rather soft style of communication can be expected in future overtime announcements, as they are aware of the unfavourable training condition. Having the same (negative) perception of training quality, trainers are likely to show the necessary sensitivity in order to prevent negative consequences.

Otherwise, in cases where the trainees perceive a quality aspect more negatively than do their trainers, even if it is still rated better (in absolute terms) than in the first case, more negative consequences are to be expected. Trainees who try to complain may face training officers with a dismissive attitude. Statements like

"overtime is a part of your training" may irritate trainees and suggest that the whole company accepts the lack of enforcement of legal standards as a normal condition. This example shows that even in a legally regulated context and despite legal options to complain, differences in perception and tacit conflicts may occur, making trainees experience powerlessness and dependency. Future communications, like the announcement of further overtime working, can be expected to be more rigorous and considerably less "soft" than in the first case. Consequently, the differences in perception between both parties could lead to a harsh climate, a more severe communication and deteriorating relationships, which entails higher potential for conflicts also. In such conditions, trainees' needs for affiliation and autonomy will hardly be met (Deci and Ryan 2000). The repeated experience that the training company is not aware of and/or not reacting to such problems could reduce trainees' motivation and self-determination over time (ibid., p. 243), and finally create discomfort and frustration (ibid., p. 248 & p. 251). Not all conflicts emerge openly and become "manifest", as many differences in perception are likely to result in "latent conflicts" (Lempert 1993, p. 7) that are not declared to the counterpart. Nevertheless, this distinction is not necessarily related to the severity of a conflict. It is again dependent on the subjective perception as to whether a latent conflict is severe or not (Lempert 1993).

In these simple cases of high and low divergence the potential for negative consequences becomes clear. Therefore, it is expected that negative differences in perception between trainees and their trainers impact the perception of quality output aspects – in our case drop-out intentions – negatively. We call this theoretical rationale the Negative Incongruence Theorem (NIT): The higher that trainees deviate negatively from their trainer's perception, the higher the drop-out intentions should be. The difference between both perspectives will be calculated as difference accounting multi-perspective scores ("Methodological Integration of Different Perspectives via Difference Accounting Multi-perspective Scores" Section).

The Construct of Drop-Out Intentions

As initially noted, in-company training, as part of the dual system of VET, is of great importance for individual workers but also for companies and for society as a whole. Therefore, much research focuses on causes and prevention of drop-outs. As main reasons for dropping out, previous studies mostly stress trainees' socio-demographic characteristics, such as the educational level (e.g. Autorengruppe Bildungsberichterstattung 2012; Bessey and Backes-Gellner 2015; CEDEFOP 2016; Dornmayr and Nowak 2012; Faßmann and Funk 1997; Greilinger 2013), as well as company-related characteristics and conflicts (e.g. Autorengruppe Bildungsberichterstattung 2012; Faßmann and Funk 1997; Greilinger 2013; Rohrbach-Schmidt and Uhly 2015; Schöngen 2003; Stalder and Schmid 2006; Quante-Brandt and Grabow 2008). Also, mismatches between training reality and trainees' previous expectations or desired occupations are commonly cited (Beicht and Walden 2013; CEDEFOP 2016; Nägele and Neuenschwander 2015; Schöngen 2003; Stalder and

Schmid 2006; Quante-Brandt and Grabow 2008).[5] It is noteworthy that drop-outs can also bring positive developments for trainees, as some may find a training place that better fits their abilities or even drop-out "upwards" (Feß 1995, p. 29), e.g. attaining an university degree.

In this study, however, we focus on drop-out intentions rather than actual drop-outs as the dependent variable, for several reasons. Firstly, most of the time drop-outs do not emerge suddenly but rather develop in a longer process (Deuer 2003, p. 21; Heublein and Wolter 2011, p. 223). By measuring drop-out intentions, it is possible to detect cases of drop-out potential, which enables trainers to intervene in time and eventually to reduce drop-outs (Aarkrog et al. 2018, p. 127; Deuer 2003). Secondly, by analysing the interdependencies of training quality and drop-out intentions, we can increase knowledge about the actual processes and relations in current training that foster drop-outs, already in the early stages of intentions (Vallerand et al. 1997, p. 1169). Lastly, retrospective surveys of actual dropouts could lead to biased statements about causes and their reasons for terminating the contracts, as trainees might not be able to summarize their experiences of several situations in valid answers (Aarkrog et al. 2018, p. 126; Rausch 2013, p. 56). Therefore, measuring intentions during the process enables the tracking of decisive factors more validly. On the other hand, not every thought of termination leads to actual drop-out. However, intentions to drop out have served as a viable predictor of actual drop-outs in several studies with respect to different types of university students (Bean and Metzner 1985, p. 527). Webb and Cotton (2018, p. 840) for instance have shown a strong relation between intentions and actual drop-outs by using a closely related construct: "contemplation of withdrawal". They found that 21.5% of respondents contemplating withdrawal actually dropped out later. In relation to high schools, Vallerand et al. (1997, p. 1168) demonstrated that drop-out intentions and real drop-outs correlate positively ($\beta = 0.24$) as well. However, conversely, these findings also clarify that drop-out intentions are not yet a drop-out decision and therefore do as predictors greatly overestimate the final occurrence of drop-out. Therefore, we argue, they should be seen as a self-reliant construct that however, and at a maximum, can (1) viably serve as an early alert system for an increased drop-out probability during the training process and (2) can serve as a strong indicator for dissatisfaction with training conditions.[6]

"Drop-out Intention" in the VET-LQI is originally operationalized in a highly differentiated way: The scale comprises drop-out intention stemming from either the training company, from the school, personal problems or general occupational reasons, in order to allow for targeted causal analysis. Since the study presented here focuses on perceptions of training quality within the company, the scale was shortened accordingly to three items focusing on company-based drop-out intentions (see items 105, 106, 111 in Appendix Table 4). On this more informative short-scale,

[5] See also "Dropout from initial vocational training– a meta-synthesis of reasons from the apprentice's point of view" by Böhn and Deutscher (submitted).

[6] Satisfaction in the context of job-training-satisfaction means the extent of positive or negative feelings about a training (Schmidt, 2007, p. 483). Since satisfaction in our survey was only addressed in a positive manner, drop-out intentions can be seen as its negative form, comprising only negative feelings or dislike towards training.

the effect of trainer-trainee differences in perceptions of quality on company-related drop-out intentions should become more valid, in terms of precision.

Data Collection and Methodological Procedure

Survey Instrument

The German version of the above-mentioned "VET-LQI" by Böhn and Deutscher (2020) was used as a validated survey instrument operationalising VET training quality. The survey instrument was compiled by an integrative content analysis of existing research instruments for VET quality (Böhn and Deutscher 2020). The survey was shortened to focus only on quality criteria in respect of the company, in order to limit the expenditure of time for these volunteering companies. 16 quality categories remained to be measured. Trainees and trainers had to answer 89 questions, aiming at identical quality criteria. The data of trainees were matched to their corresponding trainers by stating the company name.

Both survey versions for trainees and for trainers were rebuilt online with the free tool "Google forms" and sent via email (with instructions and retrieval links) to training officers of the voluntarily participating companies. The survey was presented as a quality tool for pedagogical quality management, as part of a larger research project. Trainees were made aware that neither their trainers nor unknown third parties received their data and thus, they were able to answer without any pressure or fear of negative consequences. The response options regarding quality-related questions were designed as a seven-level Likert scale (1 = strongly disagree; 7 = completely agree). The participants were able to leave out questions at any time. However, this was done rarely (83 missing values = 0.44%).

To verify the collected data's reliability, internal consistency was addressed using Cronbach's Alpha, with which, principally, high alpha values (≥ 0.7) are preferable. The "Vocational Training Framework" scale was excluded from the analysis, since it does not comprise a "reflexive theoretical concept" (Böhn and Deutscher 2020, p. 12 f.). Cronbach's Alphas (see Appendix Table 4) of the remaining scales turned out to be broadly good or at least acceptable (0.694 < Cronbach's Alpha < 0.857). The scales "Work Climate" (0.632) and "Training Requirements and Ability Level" (0.659) showed lower internal consistencies, but both were kept, in order to preserve a more comprehensive picture of training quality. Highly problematic, in contrast, was the internal consistency of the scale "Relevance of Tasks" (0.443).

Furthermore, Table 4 sets out the discriminatory power of items, which turned out to be mostly good or at least satisfying (Ebel and Frisbie 1991, p. 232), with the exception of item 061 (< 0.3). Despite this shortcoming, the respective item was not deleted, in order to prevent further restriction of the scales and their capability to cover the constructs in a valid range (see above). Discriminant validity was determined by checking the intercorrelations of different scales. Such scales can be considered as independent tests of the respective quality aspect, and thus should correlate only to a limited extent (Hartig et al. 2012, p. 158). Appendix Table 5 presents the intercorrelations of all 16 quality criteria that were included. As the correlations

were generally low and kept below 0.5, with only three minor exceptions, the measured different scales seem to indeed measure distinct quality criteria. Only "work climate" and "overload" correlated slightly more highly (0.525), while "social involvement" correlated with "feedback" (0.530) and "personnel and instructions" (0.507), indicating that these are not completely separable social aspects.

Survey Procedure

Initially, 90 regional companies in Germany that had commercial trainees were chosen via Google Maps and were contacted by telephone. In a few cases, where no contact person in the personnel department was available, a request was sent via e-mail. The survey period was 4 weeks. In all, 30 confirmations were received. Halfway through the period, responding companies were informed about their participatory status via e-mail, whereas non-responding companies were phoned again in an attempt to persuade them to participate within the set time. The final participation rate was 33.3% of all companies contacted. Most banks named security blockings or time restrictions as a reason to resign from the study.

Description of the Sample

Consequently, the final numbers of participation amounted to 30 German companies, with responses by 36 trainers (3 companies having more than one trainer) and 352 trainees. There were some further responses by trainers and trainees where unfortunately the respective other party was missing; these cases could not be considered. Another 41 responses by trainees had to be excluded, since they did not state their corresponding company unambiguously and hence could not be matched. The final sample therefore amounted to 311 trainees and 36 trainers from the 30 companies. Predominantly they were bank trainees of all kinds (85%), but also e.g. Office Management Assistants, Industrial Management Assistants and Management Assistants in Wholesale and Foreign Trade were included (see Appendix Table 6). However, all of them were commercial trainees within the German dual VET system, facing relatively similar tasks during their training, for instance profitability analyses or the management of operational processes.

42.1% of the trainees were still in their first year of training. Another third (33.4%) were in their second year, and 24.4%[7] in the third year. The majority of 58.8% were female. This corresponds to the general tendency within the commercial occupations under study, where women constitute a slight majority (BIBB 2014). Furthermore, nearly three quarters of the trainees spoke only German at home. All other trainees spoke additional languages, except for five, who spoke only foreign languages at home. With regard to prior education level, there was a tendency towards possessing the higher school leaving certificate (66.2%), as only 33% had the intermediate

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[7] Serving to account for this lower number is the fact that many trainees (around one third) shorten their training to two or two and a half years.

school-leaving certificate as their highest qualification. As Appendix Table 7 indicates, the weighted values for the included training occupations do not differ widely from the weighted statistical population. Chi^2-tests showed no significant difference for both groups, regarding gender (p=0.209) and first year of training (p=0.117). Only with regard to the educational level (p=0.018), the sample differs from the statistical population. Therefore, this is a rather representative distribution of the relevant background characteristics for German trainees in the respective occupations.

The participating trainers are official training officers in the personnel departments of their companies, often owning a qualification according to the trainer certification regulation (AEVO) (Bahl 2012). They may not in all companies interact with trainees on a daily basis, mostly as daily interaction contacts usually change with the departments a trainee has to visit during training. However, they are responsible for obligatory training consultation (Döring and Severing 2000) and all kinds of issues and questions by trainees. The training officers are, moreover, responsible for the training structure and implementation of the curriculum (§14 German Vocational Training Act) and meet regularly with the trainees in order to monitor the training. They coordinate the training as well as further internal training activities and face relatively similar activities compared to employees in the different training-relevant departments, due to the specifics of commercial activities (Bahl 2012, p. 26). Among training officers in this sample, two thirds were female, which is a typical tendency for the commercial sector (Bahl 2012).

Methodological Integration of Different Perspectives via Difference Accounting Multi-perspective Scores

Firstly, all items were adjusted to point in the same direction, so that in each case higher responses by participants (maximum=7) indicated higher quality. Then, for each single answer from a trainee, the individual difference from his/her trainer was calculated. In the three companies where more than one trainer was involved in training, the responses by training officers were weighted to a mean value. As a result, trainees' responses were contrasted with either the responses of their own trainer or against the mean of both trainers. Trainee responses were subtracted from the respective trainer response. Therefore, the differences on a seven-point Likert scale can reach a maximum of 6, in cases where a trainer answered 7 and a trainee answered 1.

As our theoretical outline clearly assumes conflicts and a higher drop-out rate only for lower quality perceptions of the trainee compared to the trainer, only negative deviations (trainee perception < trainer perception) were considered. This means that if a trainee answered a single question more positively than did his/her trainer, the difference was set to zero, since there was no negative deviation on this particular item. Cases of positive deviation were not offset against negative ones, as this method would eliminate existent negative deviations in perceptions in our data (regarding the respective item, trainee and company). Possible negative consequences would be completely overlooked, whereas it was exactly the object of this study to measure the consequences of a lower trainee perception of training quality

compared to the trainer. It is theoretically implausible to assume that real conflict potential in one aspect is cancelled out by a positive deviation in another aspect. Consequently, item-wise differences ranged from 0 (=no negative deviation) to 6 (=maximum negative deviation).

As any difference between both parties might have more negative consequences when it arises on a low quality level, rather than on the upper end of the scale (e.g. 3–2 vs. 7–6), the item-wise differences are weighted by multiplying them with the inverse absolute rating (7 becomes 1, 6 becomes 2, 5 becomes 3, etc.). Consequently, this method leads to higher difference values in cases of low absolute ratings. Since we have cases of no difference (0) and a distortion due to the weighting shall be avoided, we previously shifted all differences by one unit. Item-wise differences then range from 1 to 7 (which makes no difference for their relation to the dependent variable). This means, in the case of a trainer rating of 6 and a trainee response of 5, the difference of 1 is added up by one unit (2) and then multiplied by 3 (inverse trainee rating), which results in a value of 6. We call the result of this integrative procedure difference accounting multi-perspective scoring (DAM scoring).

In the next step, the DAM scores were calculated for each quality scale per trainee. It is also noteworthy that only in the minority of cases did trainees rate quality aspects more positively than their trainers (30.9%). This supports the findings of bilateral studies (e.g. Ebbinghaus et al. 2010; Negrini et al. 2016), where in general trainers tended to rate training quality substantially better than did trainees. In cases where either the trainee or the trainer didn't answer a specific item, no difference could be calculated in regard to this item. The DAM score for the whole scale then consisted only of those items where both sides responded, and differences could be computed. However, both sides, especially trainees, rarely left out questions. Only in five cases (0.1%)[8] could no DAM score for a scale be calculated. In conclusion, there were 15 individual DAM scores for every trainee, addressing 15 different aspects of training quality.

Calculation of Regression Analysis

Before the links between training quality criteria and drop-out intentions can be analysed, by using the novel bilateral approach and comparing it to the "conventional" unilateral approach, the data has to be checked for possible group-effects. Since the trainees are nested in companies, there are 30 groups of trainees matched to one trainer each. Therefore, the first step in multilevel modelling is to test a null model, without predictors, in order to identify the extent to which the variance in the dependent variable "Drop-out Intentions" (SD=1.032) stems from between-trainer differences on a second level (Heck et al. 2014). The results, however, show that the intercepts do not vary on a significant level (Wald Z=0.613, p=0.540). Additionally, the intraclass correlation (ICC) displays the proportion of variance in "Drop-out Intentions" that is explained by group-effects (Hox 2010), which amounts to 1.46%. This means, there is negligible amount of variation in the dependent variable

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[8] There are 4665 deviations in total, calculated from 15 quality criteria for each of 311 trainees.

between the second level groups and therefore, the modelling of complex hierarchical regressions is not necessary for further analyses. Instead, single-level linear regression models are sufficient for the data.

Results

Prediction of Drop-Out Intentions by Trainee Perception of VET Quality

Before we take a look at the results of the "conventional" approach, which considers unilateral trainee perceptions of training, the effects of personal background information and the various training occupations on drop-out intentions were checked. Regarding personal aspects, trainees' gender, their highest school-leaving qualification and average grade, the languages spoken at home, their self-assessed performance during training in the form of a grade as well as their year of training were included in a regression on drop-out intentions (for coding and descriptive data see Appendix Table 8). The resulting model (F[10, 288] = 2.06, p = 0.028) only explained 3.4% of the dependent variable's variance (see Appendix). Two variables appeared to have a significant relation to drop-out intentions: The worse a trainee rated his/her performance during training, the higher the drop-out intentions plausibly were (p = 0.009). Also, intentions to drop-out appeared higher in the third year of training (p = 0.009). In another regression only dummy variables for the course of training were included, while the biggest group "bank clerks" served as reference. However, the model and its variables were not significant (F[5, 299] = 1.40, p = 0.226), indicating that being a bank clerk or an industrial management assistant etc. does not play a decisive role regarding drop-out intentions in this sample.

While analysing which quality criteria were related to drop-out intentions, all personal background and training course variables were included in the first block of the regression, since they exert a slight influence on the results and therefore should be controlled for. Then, all input- and process-quality scales were added into the linear regression model, still with the "Drop-out Intentions" scale the dependent variable. At first all quality criteria were included, then stepwise selection was applied in order to identify the most instructive model, which increased the adjusted R^2. The results in Table 1 are later compared to the differences approach ("Prediction of Drop-Out Intentions by Negative Differences in Perception" Section).[9]

Regarding the personal background variables in Table 1, again "Training Performance" was shown to be significantly related to drop-out intentions (p = 0.017), while "Year of Training" did not appear significant in a combined model with quality criteria. In contrast, the dummy for "Office Management Assistant" was shown significant on the alpha = 0.05 level (p = 0.014), indicating less drop-out intentions by trainees of this course. Considering the quality aspects, trainee perceptions of "Overload", "Work Climate", "Curriculum Orientation" as well as "Social Involvement" were shown to be significantly related to drop-out intentions (F[19,

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[9] Since one trainee did not respond to the three drop-out items, the regression data comprised 310 trainees.

Table 1 Model 1: Multiple regression model on drop-out intentions with trainee perception scores

Predictors	B	SE	Beta	Sig
(constant)	−4.104	.482		.000
Gender	−.099	.105	−.047	.350
Grade (in school leaving certificate)	−.002	.050	−.002	.964
Training Performance	−.148	.062	−.130	.017
Language (more than German)	−.081	.125	−.033	.516
Language (other than German)	.149	.506	.015	.769
Year of Training = 2	−.002	.119	−.001	.988
Year of Training = 3	−.163	.131	−.068	.215
Advanced technical college certif.*	.139	.165	.047	.398
Subject-related entrance certif.*	.092	.221	.022	.677
General higher education certif.*	.041	.129	.020	.752
Office Management Assistant	.580	.235	.128	.014
Industrial Management Assistant	−287	.360	.039	.425
Management Assistant in Wholesale and Foreign Trade	.300	.499	.029	.548
Dual students of Business Administration and Commerce	.246	.283	.043	.386
Management Assistant Informatics	.008	.390	.001	.983
Overload	.260	.058	.274	.000
Work Climate	.218	.071	.191	.002
Curriculum Orientation	.158	.056	.149	.005
Social Involvement	.140	.066	.126	.036

B regression coefficient, *SE* standard error

Adjusted R^2 = .333. * Reference category is 'Secondary school certificate or less'. Reference category for training occupations is 'Bank Clerk'

n = 311

274] = 8.70, p < 0.001). All four aspects showed a small standardized effect size (Cohen 1988, p. 80), with "Overload" having the highest effect (0.274). The model shows a high level[10] of variance explanation, with an adjusted R^2 of 0.333 (Cohen 1988, p. 414). The coefficients in Table 1 show that trainees who perceived those criteria to be of higher quality in their company, showed less intention to drop out of training, as they gave more positive responses on the scale "Drop-out Intentions".[11] Thus, from the perspective of trainees, an appropriate workload in particular, but also more curriculum-orientated training, better social involvement as well as a pleasant working atmosphere, contributed to the reduction in drop-out intentions.[12]

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[10] Classification according to Cohen (1988, p. 413 ff.): $R^2 \geq$ .02 = small effect; $R^2 \geq$ .13 = medium effect; $R^2 \geq$ .26 = large effect of variance explanation.

[11] The maximum of 7 would indicate trainees have no drop-out intentions at all.

[12] Multicollinearity was checked by assessing the Variance Inflation Factor (VIF), which remained < 1.71 in all models. Therefore, multicollinearity is no issue in the presented models (Hair et al. 2014).

Table 2 Model 2: Multiple regression model on drop-out intentions with DAM scores

Predictors	B	SE	Beta	Sig
(constant)	1.188	.189		.000
Gender	−.082	.096	−.039	.393
Grade (in school leaving certificate)	.024	.046	.024	.611
Training Performance	−.149	.057	−.130	.009
Language (more than German)	−.055	.114	−.022	.631
Language (other than German)	.130	.464	.013	.780
Year of Training = 2	.077	.108	.035	.481
Year of Training = 3	−.134	.120	−.056	.269
Advanced technical college certif.*	.108	.151	.037	.477
Subject-related entrance certif.*	.111	.201	.026	.583
General higher education certif.*	.040	.117	.020	.731
Office Management Assistant	.327	.210	.072	.121
Industrial Management Assistant	.214	.331	.029	.519
Management Assistant in Wholesale and Foreign Trade	.561	.462	.055	.226
Dual students of Business Administration and Commerce	.006	.258	.001	.981
Management Assistant Informatics	.057	.356	.007	.873
DAM Overload	−.057	.009	−.337	.000
DAM Work Climate	−.057	.013	−.229	.000
DAM Personnel and Instructions	−.027	.013	−.113	.034
DAM Curriculum Orientation	−.025	.011	−.115	.018
DAM Variety of Tasks	−.019	.009	−.105	.030

B regression coefficient, *SE* standard error, *DAM* Difference accounting multi-perspective score

Adjusted R^2 = .439. * reference category is 'Secondary school certificate or less'. Reference category for training occupations is 'Bank Clerk'

Prediction of Drop-Out Intentions by Negative Differences in Perception

Another possibility for gaining insights into how drop-out intentions emerge, is the following new approach that focuses on differences in perception. In contrast to the regression model of "Prediction of Drop-Out Intentions by Trainee Perception of VET Quality" Section, the individual quality DAM scores of trainees were put into the model as independent variables this time. The higher the DAM scores, the higher the intentions to drop out should be, as displayed in a lower rating on the scale "Drop-out Intentions". Again, a stepwise selection of variables was applied in the regression model, in order to identify the most instructive model. The resulting model ($F[20, 273]$ = 12.47, p < 0.001) showed a variance explanation of adjusted R^2 = 0.439 (Table 2). Again, regarding trainees' characteristics, only "Training Performance" is significant (p = 0.009) and none of the different training occupations appear to have a significant effect on drop-out intentions.

Five quality criteria in the form of DAM scores are significantly related to drop-out intentions ($F[6, 298]$ = 43.24, p < 0.001). The DAM scores in the categories

Table 3 Changes in predictors by usage of DAM scores: Comparison of regression models 1 and 2

Predictors	Δ|Betal	in%
DAM Overload	.063	+ 23.0
DAM Work Climate	.038	+ 19.9
DAM Curriculum Orientation	.034	−22.8

DAM Difference accounting multi-perspective score

$n = 311$

"Work Climate", "Personnel and Instructions", "Curriculum Orientation" and "Variety of Tasks", show a small effect size (Cohen 1988, p. 80 f.). The quality criteria "Overload" shows a medium effect (−0.337).[13] The hypothesis that negative differences in perception between trainees and their trainer increase drop-out intentions is therefore supported. If trainees perceive the quality of these criteria worse than their trainers do, they show a stronger intention to drop out, as indicated by a lower rating on the "Drop-out Intention" scale.

Apart from this, there are three interesting points in comparison to model 1 (trainee perception scores only) that should be emphasized. First, the model's adjusted R^2 is 0.439 and thus, the difference-approach now explains an additional 10.6 percentage points variance in drop-out intentions, which equals a growth of explained variance from model 1 to model 2 of almost 32%. However, it must be noted that the two models are not completely comparable, since different quality aspects were included, but the increase of explanatory power from using DAM scores needs to be accounted for nonetheless. Second, two additional training quality criteria come into focus in the second model, as the "Variety of Tasks" and "Personnel and Instructions" scales did not play a role in the first approach. Furthermore, "Social Involvement" is not significantly related to drop-out intentions when considered as DAM score. Third, the categories "Overload", "Work Climate" and "Curriculum Orientation" were significantly related to drop-out intentions in both models, with partly growing beta-coefficients in the second model. The differences in these approaches are presented in Table 3.

The first column of Table 3 shows the absolute change in beta per quality criterion, in comparison to Table 2. The second column presents the coefficients' percentage change. The effects of "Overload" and "Work Climate" increased considerably with the use of DAM scores. However, the beta coefficient of "Curriculum Orientation" decreased by 0.034. Considering the percentage growth of beta coefficients, the effect of "Overload" increased by 23%, that of "Work Climate" by almost 20%.

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[13] The minus signs in Table 2 are caused by an inverse logic of the DAM scores (see Methodological Integration of Different Perspectives via Difference Accounting Multi-perspective Scores and Prediction of Drop-Out Intentions by Negative Differences in Perception Sections). The coefficients represent a decrease on the scale "Drop-out Intentions", which means a lower rating by trainees and higher drop-out intention, where differences from their trainers are higher. Table 1 on the other hand indicates that higher quality criteria are related to an increase in the "Drop-out Intentions" scale, which in turn means there is less intention to drop out. Therefore, absolute beta values were compared.

Additionally, Fisher tests for dependent samples were conducted, in order to check whether the differences between both approaches were significant. Therefore, the intercorrelations of a given quality criterion in the conventional style ("Prediction of Drop-Out Intentions by Trainee Perception of VET Quality" Section) with those in the DAM style ("Prediction of Drop-Out Intentions by Negative Differences in Perception" Section) on "Drop-out Intentions" were used (correlations are presented in the Appendix Table 9). Considering "Overload", both types of variables showed a significant difference in their relation to drop-out intentions ($z = 3.407$; $p < 0.001$). The two variable types for "Work Climate" as well showed statistically significant differences ($z = 3.498$; $p < 0.001$). For "Curriculum orientation" a significant difference on the alpha $= 0.05$ level appeared ($z = 2.244$; $p = 0.012$). Again, this means that it makes a difference whether simply trainee perceptions or on the other hand the perspective-crossing approach of differences, is applied in VET quality research. Moreover, the difference-approach seems fruitful, since two more quality criteria came into focus, and the explanatory power of the model increased considerably (see Table 2).

Prediction of Drop-Out Intentions Using a Merged Model

Lastly, to check the impressions from the results above, a multiple linear regression was run by using both types of variables but only allowing each quality criteria once. The resulting model ($F[7, 297] = 38.19$, $p < 0.001$), which best explains drop-out intentions in the sample, contains all five quality DAM scores from Table 2 and none of the criteria, in the form of one-sided trainee perceptions from Table 1.[14] This means, even by using both types of variables, the bilateral difference approach appears to be advantageous, as the final and most instructive model is equivalent to Table 2. The DAM scores appear significant on higher levels than the unilateral variables in the model. Additionally, when including both variables, the adjusted R^2 is similarly to the DAM score model (0.439), while using trainee perceptions only yielded an adjusted R^2 of 0.333. Therefore, the results underline the previous impressions and indicate that DAM scores are not only significantly related to drop-out intentions but are capable of explaining them more adequately than do mere trainee perceptions.

Discussion and Limitations

Conventional unilateral quality research in VET is certainly expedient, but can only be a starting point, since there are at least two important groups of actors involved. On the basis of Lempert's interactionist theory (1998) it is plausible that drop-out

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[14] Initially "Overload" was the only variable in unilateral form that appeared significant, increasing the adjusted R^2 by one percentage point. However, since each quality criteria shall only be included once, it was deleted for its higher p-value (.016) and smaller effect size than the DAM score "DAM Overload" ($p < .001$). In the following model (stepwise selection), no other unilateral or bilateral quality criteria took its place and the resulting final model was equivalent to Table 2.

intentions form more out of the interactions of both parties, as influenced by their perceptions of the environment, than from isolated perceptions. Thus, by using multi-perspective approaches, it would be possible to gain more insights into professional socialization processes within VET training, which in turn could help to prevent drop-outs from VET more effectively. Empirically, the presented bilateral approach of considering differences in quality perception between trainees and trainers from the same company proved to add significantly to the overall explanatory power of research on drop-out intentions. Moreover, integrating different perceptions into the model leads to the consideration of additional (and different) quality aspects and to increased effect sizes also. This underlines that it is worthwhile to expand the research in order to adequately integrate multiple perspectives into the analysis of VET quality characteristics and their impact on output categories (in our case drop-out intentions). The findings could possibly explain the low or absent influences of training quality on output criteria when using a mono-perspective approach based on trainees' perceptions only (e.g. Nickolaus et al. 2009). A methodological approach of how to integrate these different perspectives, while paying attention to the absolute level of quality assessment as well, is given via the difference accounting multi-perspective scoring (DAM) as a possible blueprint.

The presented approach should be tested further in future research. Within such research, the sample should be chosen more broadly with respect to the occupational groups included, since our analyses were limited to commercial apprenticeships, with a focus on banking. Nevertheless, we believe our findings to be relatively robust with respect to the commercial field, since we used a relatively representative sample with respect to most variables compared with the statistical population. Furthermore, by including dummy variables, it could be demonstrated that the different occupations in our sample do only play a minor role for the tested Negative Incongruence Theorem (NIT) – at least for the commercial sample that was analysed. Theoretically, it can be expected that the multi-perspective approach explains even higher proportions of variance in other occupations, where the drop-out rates, and likewise the drop-out intentions, are reported to be higher than in the commercial and banking sector.

Regarding further limitations of the study, besides the general background factors that were considered, omitted factors like trainees' socio-economic background, but also their motivation and interests, that were not assessed in our study, may have an influence on the perception of training quality, drop-out intentions, as well as on the interrelation of these two variables. An integration of such variables might further increase the explained variance by the models presented and thereby explain the phenomenon of drop-out intentions more fully. Moreover, a more thorough collection of individual background information on the side of the trainees and their trainers might also serve to gain more pronounced insights into the genesis of differences in perception, explaining the actual causes of disagreements and thereby opening up further room for practice intervention.

By focusing on inter-individual differences, we intended to close a prevailing research gap regarding the importance of the perception of interactional

micro-processes during in-company training and their influence on important output variables. This was demonstrated for the output variable of drop-out intentions. However, we acknowledge that the complexity of the actual drop-out process resides on different levels with multiple interacting factors. Particularly, the study presented here left out influencing factors, that may work on the macro-level, like the regional job market or the general economic situation, which are known to be involved in the process of actual drop-out (e.g. Rohrbach-Schmidt and Uhly 2015) and could also add to the explanation of drop-out intentions.

Furthermore, the validity of trainer perceptions is imperfect, since only official training officers were asked to participate. It has to be noted that official training officers are not always the main source of interaction for a trainee. There might be several persons periodically interacting with trainees (e.g. close colleagues). Nevertheless, this was a conscious choice in the present research, as the perceptions of training officers are particularly important, since they are in charge of the training and responsible for planning and directing future training. If more detailed information on the interactional processes within each participating company were available, the main interaction partner among the training personnel could be identified, which could increase the explained variance of drop-out intentions further by a higher accuracy. Another limitation lies in the unsatisfactory reliability values, especially for the included variable "Relevance of Tasks". This stems from the survey instrument used (VET-LQI), which was originally developed to measure trainee perceptions, and which was only tested within the group of trainees. Some of the items thus are as yet untested for use in the trainer side of bilateral surveys. Further research into this, and the development of some extra items for these scales should be conducted, for a use in future multi-perspective studies. Such studies do not necessarily have to be limited to commercial apprenticeships or the company side only. The DAM approach could also be applied in the school-context, using a teacher-versus-learner research design.

With respect to the implications of the findings for vocational practice, multi-perspective approaches to training quality seem to be a promising tool in order to meet the challenges of a complex and interactive training reality. In practice, by using the presented DAM approach in monitoring training quality, the largely subjective quality criteria could be complemented by a second perspective. It could therefore serve as a complementary – and more balanced – tool in the quality assurance of in-company training. Moreover, such a multi-perspective tool could function as an early-alert-system for growing dissent before factual negative developments start to kick in. Here, if differences in perception increase, negative consequences can still be avoided by identifying potential causes, initiating dialogue (between trainees, trainers and possibly other actors) and taking reconciling actions at an early stage. Ideally, in order for this multi-perspective approach to take full effect, a system of steady interchange between trainees and trainers guided by multi-perspective instruments would be installed.

Appendix

Table 4 Item statistics

Scale	Item	Cronbach's α (if item deleted)	Mean value	Standard deviation	Discriminatory power
Learning Environment					
Work Climate (α .632)	022 There is a personal atmosphere within my company	.581	5.60	1.12	.387
	023 There is a bad working atmosphere in my company. [R]	.461	5.48	1.36	.538
	024 There is strong competition between employees in my company. [R]	.586	5.37	1.30	.379
	025 Employees in my company are rigorously monitored and controlled. [R]	.606	4.60	1.36	.354
In-company Learning (α .805)	026 Workplace learning in my company is characterized by different teaching methods		4.81	1.46	.675
	027 Workplace learning in my company is characterized by the usage of different materials and media		5.09	1.41	.675
Work Tasks					
Overload (α .795)	045 In my company I feel under time pressure at work. [*]	.784	5.39	1.27	.483
	048 In my company others interfere with my work. [*]	.806	6.14	1.10	.390
	049 I have problems recharging my energy in my spare time after work. [*]	.727	5.63	1.62	.662
	050 Because of the daily demands in my company I feel totally exhausted, tired and drained. [*]	.707	5.01	1.58	.716
	051 I often think 'I can't go on any longer'. [*]	.735	5.87	1.50	.639
Variety of Tasks (α .799)	052 In my company I deal with a variety of work tasks	.847	5.20	1.23	.522
	053 In my company I work on new tasks every now and then	.658	5.52	1.21	.709
	054 In my company work tasks are highly diversified	.651	5.25	1.28	.712

Table 4 (continued)

Scale	Item	Cronbach's α (if item deleted)	Mean value	Standard deviation	Discriminatory power
Autonomy (α .857)	056 In my company I am given flexibility in the timing of work tasks	.840	3.99	1.43	.692
	057 In my company I am able to decide what means to take to reach a goal	.795	4.06	1.43	.736
	058 In my company I am given an enormous amount of freedom in doing my job	.758	4.07	1.46	.778
Relevance of Tasks (α .443)	059 In my company I am given responsible tasks	.216	5.30	1.22	.347
	060 In my company I work on 'real tasks'	.064	5.95	1.08	.463
	061 In my company I have to deal with several tasks that are not part of my vocational training program (e.g. make coffee, copying, etc.). [R]	.751	5.19	1.60	.089
Complexity of tasks (α .754)	063 In my company work tasks are characterized by considering a wide range of information	.620	5.24	1.15	.635
	064 In my company work tasks are characterized by considering a wide range of objectives. [*]	.640	4.72	1.25	.609
	065 In my company work tasks are characterized by considering changes over time	.757	5.12	1.38	.517
Training Requirements and Ability level (α .659)	067 In my company I am confronted with tasks that are too complicated. [*]	.232	5.47	1.20	.503
	068 In my company I am confronted with tasks I am insufficiently trained and prepared for. [*]	.478	5.24	1.49	.503
Social Interaction					

Table 4 (continued)

Scale	Item	Cronbach's α (if item deleted)	Mean value	Standard deviation	Discriminatory power
Involvement in Occupational Expert Culture (α .842)	072 I am involved in the improvement of work processes in my company	.778	4.49	1.69	.713
	073 My ideas and proposals are considered in my company	.764	4.72	1.46	.732
	074 I am involved in the discussion of technical and professional issues in my company	.802	4.11	1.61	.686
Functional Involvement (α .723)	075 Continuous collaboration is part of the daily work in my company	.678	5.93	1.05	.492
	076 My work tasks are characterized by close cooperation with other employees in my company	.724	5.03	1.29	.354
	077 I am involved in all work tasks in my department	.645	4.72	1.54	.557
	078 Basically, my work tasks play a crucial role for my department	.674	4.43	1.47	.492
	079 I am well integrated into the operational working procedures	.651	5.48	1.08	.569
Social Involvement (α .779)	080 Employees in my company are interested in me	.640	5.72	1.17	.744
	081 Employees in my company are interested in my private well-being	.769	5.02	1.51	.556
	083 Employees in my company seem disturbed by my presence. [R]	.758	6.38	1.06	.517
	084 Employees in my company ignore me. [R]	.730	6.56	.91	.603
Educational Mediation					

Table 4 (continued)

Scale	Item	Cronbach's α (if item deleted)	Mean value	Standard deviation	Discriminatory power
Mentoring (α .710)	085 In my company nobody feels responsible for me. [R]	.531	6.23	1.30	.597
	086 In my company I am completely left alone to myself. [R]	.536	6.19	1.15	.595
	088 When I ask training personnel or colleagues for help, they immediately support	.745	6.13	1.03	.414
Curriculum Orientation (α .694)	089 I do know my in-company training plan	.564	6.12	1.24	.538
	090 The arrangements of my in-company training plan are observed	.541	5.85	1.21	.556
	091 My in-company training program is implemented without a formal training plan. [R]	.689	6.47	1.17	.437
Feedback (α .757)	092 In my company good performances are not praised. [R]	.777	5.75	1.45	.419
	093 Normally I do know whether I perform work tasks satisfactorily or not	.683	5.51	1.27	.590
	094 I find it hard to figure out whether I perform work tasks satisfactorily or not. [R]	.690	5.57	1.47	.574
	095 The training personnel and my colleagues let me know whether I perform work tasks satisfactorily or not	.646	5.54	1.23	.665
Personnel and Instructions (α .850)	097 Those who train me on the job are able to answer difficult technical questions	.810	5.88	1.20	.688
	098 Those who train me on the job can explain well	.777	5.78	1.08	.769
	100 Those who train me on the job show that they enjoy their work	.855	5.22	1.35	.614
	101 Those who train me on the job are technically competent	.798	6.16	.92	.747

Table 4 (continued)

Scale	Item	Cronbach's α (if item deleted)	Mean value	Standard deviation	Discriminatory power
Output					
Drop-out Intentions (selected from "Premature Termination of Contract") (α .766)	105 I often think about terminating my training program prematurely. [*]	.558	6.34	1.22	.705
	106 I think about terminating my training program prematurely because of company-related reasons (e.g. working hours, quarrels with colleagues, etc.). [*]	.582	6.55	1.06	.688
	111 I am already searching for an alternative training company. [*]	.836	6.68	.91	.443

[R] = reversed items. [*] = items reverse-scored for the analysis in order to facilitate understanding of the results. 7 represents maximum quality. Original response options: 1 = strongly disagree, 2 = mostly disagree, 3 = slightly disagree, 4 = partly agree, 5 = slightly agree, 6 = mostly agree, 7 = completely agree

n = 341

Table 5 Intercorrelations of quality scales

		Work Climate	In-Company Learning	Overload	Variety of Tasks	Autonomy	Relevance of Tasks	Complexity of Tasks	Training Requirements and Ability Level
Work Climate	Correlation (Pearson)	1							
	Significance (2-sided)								
	N	341							
In-Company Learning	Correlation (Pearson)	.218**	1						
	Significance (2-sided)	0.000							
	N	341	340						
Overload	Correlation (Pearson)	.525**	.254**	1					
	Significance (2-sided)	0.000	0.000						
	N	341	340	341					
Variety of Tasks	Correlation (Pearson)	.221**	.275**	.206**	1				
	Significance (2-sided)	0.000	0.000	0.000					
	N	341	340	341	341				
Autonomy	Correlation (Pearson)	.221**	.249**	.298**	.207**	1			
	Significance (2-sided)	0.000	0.000	0.000	0.000				
	N	341	340	341	341	341			

Table 5 (continued)

		Work Climate	In-Company Learning	Overload	Variety of Tasks	Autonomy	Relevance of Tasks	Complexity of Tasks	Training Requirements and Ability Level
Relevance of Tasks	Correlation (Pearson)	.414**	.162**	.384**	.376**	.352**	1		
	Significance (2-sided)	0.000	0.003	0.000	0.000	0.000			
	N	341	340	341	341	341	341		
Complexity of Tasks	Correlation (Pearson)	-0.081	.233**	-.148**	.256**	.188**	.156**	1	
	Significance (2-sided)	0.135	0.000	0.006	0.000	0.000	0.004		
	N	340	339	340	340	340	340	340	
Training Requirements and Ability Level	Correlation (Pearson)	.296**	.117*	.443**	0.043	.111*	.156**	-.165**	1
	Significance (2-sided)	0.000	0.031	0.000	0.429	0.040	0.004	0.002	
	N	341	340	341	341	341	341	340	341
Involvement in Occupational Expert Culture	Correlation (Pearson)	.322**	.361**	.307**	.300**	.437**	.373**	.141**	0.048
	Significance (2-sided)	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.378
	N	339	338	339	339	339	339	338	339

Table 5 (continued)

		Work Climate	In-Company Learning	Overload	Variety of Tasks	Autonomy	Relevance of Tasks	Complexity of Tasks	Training Requirements and Ability Level
Functional Involvement	Correlation (Pearson)	.289**	.348**	.300**	.420**	.356**	.498**	.299**	.146**
	Significance (2-sided)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007
	N	341	340	341	341	341	341	340	341
Social Involvement	Correlation (Pearson)	.445**	.210**	.458**	.202**	.197**	.385**	0.053	.291**
	Significance (2-sided)	0.000	0.000	0.000	0.000	0.000	0.000	0.328	0.000
	N	341	340	341	341	341	341	340	341
Mentoring	Correlation (Pearson)	.407**	.221**	.439**	.245**	.186**	.331**	0.003	.288**
	Significance (2-sided)	0.000	0.000	0.000	0.000	0.001	0.000	0.961	0.000
	N	341	340	341	341	341	341	340	341
Curriculum Orientation	Correlation (Pearson)	.278**	.396**	.270**	.241**	0.088	.300**	.168**	.214**
	Significance (2-sided)	0.000	0.000	0.000	0.000	0.104	0.000	0.002	0.000
	N	341	340	341	341	341	341	340	341

Table 5 (continued)

		Work Climate	In-Company Learning	Overload	Variety of Tasks	Autonomy	Relevance of Tasks	Complexity of Tasks	Training Requirements and Ability Level
Feedback	Correlation (Pearson)	.372**	.321**	.470**	.307**	.204**	.368**	0.038	.322**
	Significance (2-sided)	0.000	0.000	0.000	0.000	0.000	0.000	0.486	0.000
	N	341	340	341	341	341	341	340	341
Personnel and Instructions	Correlation (Pearson)	.448**	.289**	.387**	.267**	.240**	.424**	.153**	.201**
	Significance (2-sided)	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000
	N	340	339	340	340	340	340	339	340
Drop-out Intentions	Correlation (Pearson)	.387**	.157**	.467**	.200**	.186**	.324**	0.008	.350**
	Significance (2-sided)	0.000	0.004	0.000	0.000	0.001	0.000	0.880	0.000
	N	340	339	340	340	340	340	339	340

		Involvement in Occupational Expert Culture	Functional Involvement	Social Involvement	Mentoring	Curriculum Orientation	Feedback	Personnel and Instructions	Drop-out Intentions
Involvement in Occupational Expert Culture	Correlation (Pearson)	1							
	Significance (2-sided)								
	N	339							

Table 5 (continued)

		Work Climate	In-Company Learning	Overload	Variety of Tasks	Autonomy	Relevance of Tasks	Complexity of Tasks	Training Requirements and Ability Level
Functional Involvement	Correlation (Pearson)	.484**	1						
	Significance (2-sided)	0.000							
	N	339	341						
Social Involvement	Correlation (Pearson)	.328**	.359**	1					
	Significance (2-sided)	0.000	0.000						
	N	339	341	341					
Mentoring	Correlation (Pearson)	.290**	.347**	.486**	1				
	Significance (2-sided)	0.000	0.000	0.000					
	N	339	341	341	341				
Curriculum Orientation	Correlation (Pearson)	.261**	.341**	.334**	.434**	1			
	Significance (2-sided)	0.000	0.000	0.000	0.000				
	N	339	341	341	341	341			

Table 5 (continued)

		Work Climate	In-Company Learning	Overload	Variety of Tasks	Autonomy	Relevance of Tasks	Complexity of Tasks	Training Requirements and Ability Level
Feedback	Correlation (Pearson)	.338[**]	.353[**]	.530[**]	.472[**]	.388[**]	1		
	Significance (2-sided)	0.000	0.000	0.000	0.000	0.000			
	N	339	341	341	341	341	341		
Personnel and Instructions	Correlation (Pearson)	.338[**]	.418[**]	.507[**]	.497[**]	.439[**]	.422[**]	1	
	Significance (2-sided)	0.000	0.000	0.000	0.000	0.000	0.000		
	N	338	340	340	340	340	340	340	
Drop-out Intentions	Correlation (Pearson)	.162[**]	.236[**]	.379[**]	.308[**]	.256[**]	.262[**]	.363[**]	1
	Significance (2-sided)	0.003	0.000	0.000	0.000	0.000	0.000	0.000	
	N	338	340	340	340	340	340	339	340

[**]Correlation is significant at $\alpha = .01$ (two-sided). [*]Correlation is significant at $\alpha = .05$ (two-sided)

Table 6 Sample composition (trainees) and drop-out rates

Skilled occupation	N	Percentage	Drop-out rate (BIBB)
Bank Clerk ('Bankkaufmann/– frau; Finanzassistent/-in'; duales Studium BWL Bank)	266	85.5	9.2%
Industrial Management Assistant ('Industriekaufmann/– frau')	7	2.3	8.9%
Management Assistant in Informatics ('Informatikkaufmann/– frau')	6	1.9	14.4%
Office Management Assistant ('Kaufmann/– frau für Büromanagement')	17	5.5	24.4%
Management Assistant in Wholesale and Foreign Trade ('Kaufmann/– frau im Groß und Außenhandel')	4	1.3	16.6%
Dual Students of Business Administration and Commerce ('Duales Studium BWL Fachrichtung Handel')	11	3.5	6.9%*

Drop-out rates by December 31, 2018, retrieved from the Federal Institute for Vocational Education and Training (BIBB). * Result from a survey on drop-out rates of dual students, reported by Kupfer et al. (2014), on behalf of the BIBB. It is presented as approximate information, since no statistical information was available

Table 7 Sample representativeness

	Gender	Year of Training	Education (Percentage of trainees)	
	Percentage female	Percentage in the first year of training	Secondary school certificate (or lower)	Higher school certificate
Sample	58.8	42.1	33.4	66.2
Statistical population	52.3	36.6	27.7	70.4

Statistical population refers to all trainees being in an apprenticeship in one of the included occupations by December 31, 2018. Data for the statistical population was available by the Federal Institute for Vocational Education and Training (BIBB). All values are weighted by the share of the different occupations in the sample

Table 8 Personal background characteristics of trainees

Aspect	Coding	Frequency	Percentage	Valid Percentage	Cumulated Percentage
Year of Training n=311	1	131	42,1	42,1	42,1
	2	104	33,4	33,4	75,6
	3	76	24,4	24,4	100,0
Gender n=311	Male	128	41,2	41,2	41,2
	Female	183	58,8	58,8	100,0
Education (highest school leaving certificate) n=311	Lower secondary school certificate (Hauptschule)	1	0,3	0,3	0,3
	Secondary school certificate (Mittlere Reife)	104	33,4	33,4	33,8
	Advanced technical college (Fachhochschule)	43	13,8	13,8	47,6
	Subject-related entrance qualification (fachgebundene Hochschulreife)	19	6,1	6,1	53,7
	General higher education certificate (allgemeine Hochschulreife/Abitur)	144	46,3	46,3	100,0
Grade (average grade in school leaving certificate) n=306	1,0–1,5	17	5,5	5,6	5,6
	1,6–2,0	67	21,5	21,9	27,5
	2,1–2,5	112	36,0	36,6	64,1
	2,6–3,0	86	27,7	28,1	92,2
	3,1–3,5	21	6,8	6,9	99,0
	3,6–4,0	3	1,0	1,0	100,0
Training Performance (self-assessed grade) n=306	1,0–1,5	31	10,0	10,1	10,1
	1,6–2,0	121	38,9	39,5	49,7
	2,1–2,5	114	36,7	37,3	86,9
	2,6–3,0	32	10,3	10,5	97,4
	3,1–3,5	8	2,6	2,6	100,0

Table 8 (continued)

Aspect	Coding	Frequency	Percentage	Valid Percentage	Cumulated Percentage
Language(s) (spoken at home) n=309	Only German	236	75,9	76,4	76,4
	More than German	70	22,5	22,7	99,0
	Only other than German	3	1,0	1,0	100,0

N maximum=311

Table 9 Intercorrelations of significant variables in both types

		Work Climate	DAM Work Climate	Overload	DAM Overload	Curriculum Orientation	DAM Curriculum Orientation	Drop-out Intentions
Work Climate	Correlation (Pearson)	1						
	Significance (2-sided)							
	N	311						
DAM Work Climate	Correlation (Pearson)	-.902**	1					
	Significance (2-sided)	.000						
	N	311	311					
Overload	Correlation (Pearson)	.516**	-.508**	1				
	Significance (2-sided)	.000	.000					
	N	311	311	311				
DAM Overload	Correlation (Pearson)	-.454**	.512**	-.912**	1			
	Significance (2-sided)	.000	.000	.000				
	N	311	311	311	311			
Curriculum Orientation	Correlation (Pearson)	.279**	-.287**	.259**	-.268**	1		
	Significance (2-sided)	.000	.000	.000	.000			
	N	311	311	311	311	311		
DAM Curriculum Orientation	Correlation (Pearson)	-.268**	.317**	-.267**	.308**	-.906**	1	
	Significance (2-sided)	.000	.000	.000	.000	.000		
	N	311	311	311	311	311	311	
Drop-out Intentions	Correlation (Pearson)	.456**	-.532**	.521**	-.588**	.312**	-.364**	1
	Significance (2-sided)	.000	.000	.000	.000	.000	.000	
	N	310	310	310	310	310	310	310

DAM = Difference accounting multi-perspective score

**Correlation is significant on a .01 level (two-sided)

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