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Structuring the complexity of drop-out from VET: a theoretical framework guiding empirical research perspectives

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Abstract

After more than 50 years of research on drop-out from Vocational Education and Training (VET), databases provide vast amounts of drop-out studies from around the globe that entail hundreds of potential drop-out factors. However, many scholars tend to explore the topic without detailed and theoretically grounded foundation. Several diverging research foci exist within the research field of drop-out from VET: Studies differ with regard to the analysed phase of drop-out (development, decision-making, paths after dropping out), the applied sample perspective (learners, educators, further stakeholders), and the overall research perspective that is applied based on a specific theoretical approach. Given the range of drop-out factors, stakeholders, and possible theoretical approaches within studies, this article aims at organising the research on the multi-facetted phenomenon for future endeavours by presenting a framework model that comprises a three-step recommendation: First, the model illustrates different phases (Development-, Decision-, Adjustment-Phase) of drop-out research that should be differentiated. Second, it is argued that the chosen sample perspective is highly relevant for drop-out research and must be chosen carefully. Third, the overarching disciplinary research perspectives on drop-out from VET, which scholars may adopt within their research, entail particular relevant variables and focal points and should therefore be discussed. Four examples of research perspectives (economical, psychological, sociological, pedagogical) are briefly presented, structured on a micro-, meso- and macro-level, to exemplify different theoretical accesses to drop-out research. Throughout the article, the novel organisation framework is explained and exemplified by illustrating relevant aspects of each research area and exemplary literature. The presented framework will help organising the research field and enable scholars to delimit their work more precisely, leading to a more traceable structure of further research efforts and more significant contributions to the state of knowledge.

Key points

- o Drop-out research varies largely regarding included influencing factors, phases, stakeholders, and (disciplinary) perspectives.
- o An organisation framework is presented to systematise future drop-out research, increasing depth and comparability.

o Four disciplinary research perspectives on drop-out are discussed exemplarily, illustrating the various possible research perspectives.

Keywords Drop-out, Vocational education and training, Perspectives, Contract terminations, Framework, Learner, Leaving

Introduction

Vocational Education and Training (VET) systems represent a crucial part of the various educational systems around the world, helping to reduce youth unemployment and the shortage of skilled workers (CEDEFOP 2016; OECD 2019). One particularly important aspect of vocational training quality is the outcome quality aspect of ‘drop-out’ (Böhn and Deutscher 2019, 2021). Research on drop-out from VET has a long tradition. For instance, Johnson (1968) contributed to this field of research in Canada, while Barocci (1972) conducted studies in the United States. Similarly, Grieger (1981) and Weiß (1982) made significant contributions to the understanding of drop-out in Germany. These studies have laid the foundation for the exploration of the drop-out phenomena in VET. More than 50 years later, literature databases provide vast amounts of drop-out studies from around the globe, spawning hundreds of potential drop-out reasons (see e.g., Böhn and Deutscher 2022). Besides research on possible drop-out reasons, drop-out research targets, for instance, how different influencing factors interrelate, how the decision to leave one’s training is made, how perspectives diverge between different actor groups, what paths are chosen after leaving VET, how long do such re-orientations take, and what long-term effects of dropping out can be identified. However, scholars tend to explore the topic without detailed and theoretically grounded description of their research design and context. Consequently, there is a deficiency in conducting thorough discussions concerning the empirical findings within drop-out studies that adequately address their limitations and theoretical scope (Böhn and Deutscher 2022; Ebbinghaus 2016). A closer look reveals that there are clearly diverging research foci within the drop-out field: Studies seem to differ at least regarding the analysed phases of drop-out (e.g., genesis of drop-out vs. actual decision-making vs. paths after dropping out), the applied sample perspective (learners, training personnel, teachers, further stakeholders), and the overall disciplinary research perspective taken from a theoretical point of view. However, researchers may benefit from adopting a more targeted approach to their empirical investigations. Given the range of factors contributing to drop-out and the multiple actors involved, focusing on a precisely defined area of drop-out research may yield more meaningful results, increase comparability of studies, and help to localise prevailing research gaps. Furthermore, researchers may adopt different theoretical lenses on the drop-out phenomenon, often without stating or differentiating from other possible research perspectives. For instance, researchers may choose to investigate the impact of economic factors on drop-out, such as the availability of action alternatives and cost-benefit-analyses of different actors. Alternatively, researchers may focus on exploring psychological aspects of drop-out, such as the influence of personality traits on drop-out behaviour. Both disciplinary perspectives substantiate including particular variables on specific levels within the analysis, while other aspects (out of the several hundred aspects possible) can be left out. Such specific theoretical approaches to drop-out research, mostly defined by the researchers’ disciplinary background, make a difference for the studies’ generalisability and limitations, and therefore need to be discussed.

While all the above-mentioned subtopics of drop-out research provide worthwhile research in themselves, this article tries to organise the research field for future endeavours. For this reason, at first, an organisation framework is presented that comprises different phases and perspectives of drop-out research and enables scholars to clearly delimit their empirical contribution. Using this framework, a short overview is given for the main characteristics of each research area, together with exemplary literature, comprising three steps: A closer look at (1) different target phases, (2) different sample perspectives, and (3) different disciplinary research perspectives on drop-out from VET. For the latter point, regarding the more general, overarching research perspectives researchers may adopt, four possible disciplinary perspectives on drop-out (economical, psychological, sociological, pedagogical) are presented, structured on three levels (micro-, meso-, macro-level). The article ends with a three-step recommendation to make future empirical research more traceable and a brief outlook on current and future requirements for scientific and practical advances regarding the multi-faceted phenomenon of drop-out.

Drop-out: a multi-faceted phenomenon

Drop-out from vocational training programs¹ is a complex, multi-factorial, multi-actor phenomenon that can be analysed empirically using different sample perspectives. To address this research field more precisely, Fig. 1 presents a framework model

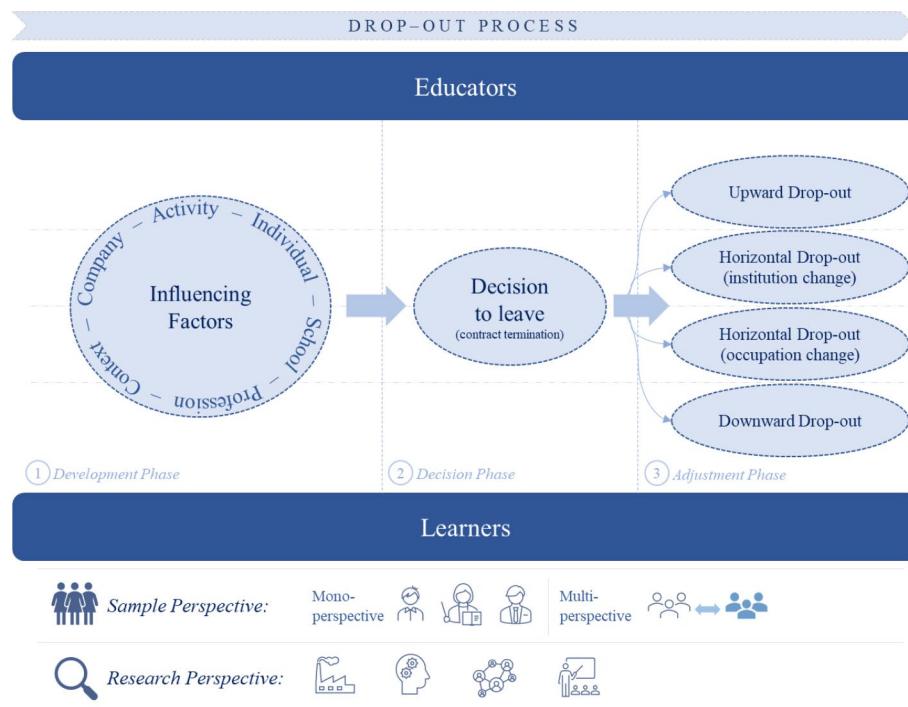


Fig. 1 Organisation framework for research on drop-out. *Note:* The figure organises phases, influencing factors, and perspectives of drop-out from vocational training. Researchers should clearly define which of the three phases are part of their analysis and indicate which sample perspective is taken for each respective phase. The general disciplinary research perspective should be stated as well. Here, the pictograms illustrate four examples: an economic, psychological, sociological, and pedagogical perspective (from left to right).

¹ Vocational training programs are organised in different institutions. The organisation framework presented here aims to consider all types of VET structures, including market systems with training solely completed in firms (e.g., Great Britain, USA), school systems with training solely in schools (e.g., France, Sweden), and dual models with a

for organising empirical research endeavours on drop-out using a processual character (based on e.g., Aarkrog et al. 2018; Heublein and Wolter 2011; Vallerand et al. 1997). In this regard, Fig. 1 chronologically outlines three different phases of drop-out from left to right and illustrates the different groups of actors involved in the process at the top and bottom (*Sample Perspective*). First, in the *Development Phase*, multiple influencing factors can be considered by researchers, potentially going far back in time. In the second phase, the concrete decision-making is targeted (*Decision Phase*). If the third phase (*Adjustment Phase*) is to be investigated, researchers could choose between different paths that learners intend to take prior to dropping-out or actually take after dropping-out, thereby adjusting their previously wrong career-decision (Fig. 1 displays four possible paths based on: Krötz and Deutscher 2022; see Sect. 2.1). For each phase that is to be analysed, researchers need to define their *Sample Perspective* as, at least, two main group of actors are involved (learners and educators). However, educators may not include the same persons over the course of different phases (see Sect. 2.2). Lastly, pictograms below Fig. 1 illustrate that different disciplinary research perspectives can be taken on, which will be discussed in Sect. 2.3. In the following, the theoretical rationale of this multi-factorial framework is briefly described within three subsections.

Target phases of drop-out research: a multi-factorial and multi-directional construct

As a first step, researchers need to be aware of the different phases of drop-out research and clearly state the focus of their investigation. The *Development Phase* constitutes the most comprehensive area of drop-out research and comprises influencing factors that reach back to the early childhood of a learner. For example, the professional experiences and education of a learner's parents may influence his/her drop-out behaviour by forming specific interests and preferences (e.g., Beinke 2011; Glaesser, 2006; Heinz 1991). Due to the long research tradition, more than 600 drop-out reasons have been identified by now (Böhn and Deutscher 2022). Following Böhn and Deutscher's (2022) meta-analysis, influencing factors can be sorted into six areas: the individual (e.g., personal characteristics, socio-demographic background, private sphere), the company (e.g., working conditions, work climate including conflicts), the profession (e.g., career choice and expectations), the school (learning climate and learning conditions), the activities (work tasks, social interaction, educational mediation), and the context (framework conditions and future aspirations).²

Additionally to the Development Phase, all these influencing factors also affect the actual decision-making in the *Decision Phase* (Fig. 1). However, to enable a more specific differentiation of the research subject, the usually rather long and multi-factorial genesis of drop-out (e.g., Ertelt 2003; Deuer 2003; Greilinger 2013; Hensge, 1984; Heublein and Wolter 2011; Lamamra and Masdonati 2008; Schuster 2016) was graphically separated from the actual realisation of the decision to leave. This allows, for instance, to incorporate and differentiate between different motivational theories and stages (e.g., action phases within the Rubicon model [see Heckhausen and Gollwitzer 1987]; analysing drop-out intention vs. drop-out decision) and different decision-making theories

combination of school- and firm-based training (e.g., Germany, Switzerland). Therefore, in this paper the term drop-out targets all learners who leave training prematurely without achieving a formal qualification, regardless of the causes, the initiator, and whether a training contract with the training company needed to be terminated.

² For more detailed information on the various influencing factors and respective studies, see the categorisation framework in Böhn and Deutscher (2022, p. 7).

(e.g., rational choice theory, bounded rationality, etc.). Furthermore, due to this separation, the initiator of the decision to leave training prematurely as well as the initiator of the contract termination (if applicable) can be considered independently of the “multi-actor genesis” of drop-out within the prior Development Phase. In this regard, most of the time, the decision to leave appears to be made one-sidedly by learners. Figures from the German dual system, where trainees possess a work contract with their training company, show that trainees initiate the termination in 52–61% of the cases. In about 25–32% of the cases, companies terminate the contracts, while only a small share of terminations represents joint decisions (e.g., Ernst and Spevacek 2012, p. 10; Greilinger 2013, p. 47; Piening et al. 2010, p. 15–16; Schöngen 2003, p. 7).

The *Adjustment Phase* denotes the time after leaving one’s vocational training prematurely. Several studies show that this phase constitutes a time of high uncertainty for dropped-out trainees, who often remain clueless about their professional future for several weeks. Even three months later, about 50% of dropped-out trainees (ranging from 42 to 58%) have not managed to find or to determine a follow-up solution (e.g., Hasler 2016; Mischler 2014; Molgat et al. 2011; Schmid and Stalder 2012; Weiß 1982). In this regard, every further path taken by learners constitutes an adjustment to the prior training, as usually almost no learner starts the same training within the same company or occupation where they dropped out. Even doing nothing, becoming unemployed, constitutes a “decision” for the next career chapter. However, not every drop-out has to be labelled as being negative since it may result in a more suitable solution for the respective learner (and other stakeholders) as well (e.g., Cart et al. 2010).

There are various potential paths that dropped-out learners can pursue (each with varying consequences for individuals, companies, and the society). Feß (1995) and Faßman (1998) differentiated three possible paths when dropping out: upward, downward, and horizontal drop-out. Apart from the considerable variation in numbers, which depend on the domain and the time of surveying, the largest proportion of drop-outs, approximately 55% (ranging from 43 to 71%)³, remains within the vocational system, which corresponds to a horizontal reorientation. To enable more specific investigations, Krötz and Deutscher (2022) split up the horizontal path into a horizontal company change versus a horizontal occupation change, as both directions involve varying causes and intentions (see e.g., Findeisen et al. 2023) and imply different consequences (e.g., regarding time loss). Figures indicate that a horizontal occupational change is slightly more frequent than a horizontal company change. While the authors work within the German context, Fig. 1 shall as well comprise mere school systems of VET. Therefore, the horizontal company change in Fig. 1 was relabelled as an ‘institution change’ in order to be more inclusive. Leaving the vocational system and attending further education outside of VET, such as visiting university, constitutes an upward drop-out. This direction is only followed by approximately 5–13% of dropouts since a higher educational level (higher education entrance certificate) is required to be able to take this path. Lastly, becoming unemployed or working in jobs without formal qualification corresponds to a

³ The average distribution of dropped-out trainees for each direction during this section is based on information from several German studies on adjustment paths (Ernst and Spevacek 2012; Mischler 2014; Piening et al. 2012; Schuster 2016; Weiß 1982), thus the range of findings is indicated as well. Because of the many and varying classifications of possible paths within studies, another small share of trainees takes other paths that are not assignable to the four-path model presented here. This illustrates a prevailing weakness in drop-out research as the data situation regarding adjustment paths is insufficient (Callan 2005; CEDEOP, 2016; see also Chap. 3).

downward drop-out and implies a path of permanent withdrawal from VET (Feß 1995; Faßmann 1998). Again, figures vary broadly but indicate that approximately 30% (22–40%) of dropped-out trainees leave the system downwards. Other drop-out classifications are possible, for instance, Meeuwisse et al. (2010) differentiate between dropping out and switching courses or institutions, while Holtmann and Solga (2023) differentiate between dropping out and stopping out.⁴ However, due to its more detailed structure that is applicable to all types of VET systems, the four-path approach of Fig. 1 is recommended.

Regardless of the research goal – whether it involves investigating the distribution of adjustment paths taken by learners (as seen in the aforementioned studies), analysing the varying influencing factors for different adjustment paths (e.g., Bessey and Backes-Gellner 2015; Holtmann and Solga 2023; Krötz and Deutscher 2022), or examining different paths taken depending on the drop-out initiator (e.g., Ernst and Spevacek 2012; Schöngen 2003) – researchers need to clearly specify their empirical endeavour and state which adjustment directions they intend to include within their analysis. Considering the question whether the adjustment paths depend on who initiated the decision to leave VET (in some cases: who terminated the contract), studies show that learners appear to follow a horizontal path (remaining within the vocational system) more often in cases when they were the initiators themselves (Ernst and Spevacek 2012, p. 10; Schöngen 2003, p. 12 ff.). Thus, it is worthwhile for research to consider the drop-out initiator and its resulting consequences. Generally, comparability of research could be increased by using the same model of adjustment paths. In this regard, the proposed four directional model offers another advantage as it validly comprises four different constructs of learners' drop-out intention during vocational training (Krötz and Deutscher 2022).

Sample perspective of Drop-out research: a multi-perspective construct

The second aspect researchers need to consider and decide carefully is the chosen sample perspective, illustrated in the following. Diving into the comprehensive list of literature on drop-out reasons, for example, as shown within the meta-analysis by Böhn and Deutscher (2022), one can discover that most of the empirical research is carried out in a mono-perspective approach targeted on learners. However, there are additional groups of actors involved in the training process, whose perspectives could be of great interest for research. For instance, concerning training quality (which is strongly related to drop-out), several studies exist that either take a mono-perspective on VET teachers' perceptions (e.g., Andersson and Köpsén 2018, 2019; Bouwmans et al. 2019; Gibb 2003; Wenström et al. 2018) or on trainers' perceptions of training quality (e.g., Cooney and Long 2008; Jansen and Pineda-Herrero 2019; Kirpal and Wittig 2009; Wilson 2019). Therefore, choosing and justifying the appropriate *Sample Perspective* is a crucial step in drop-out research.

In addition to a mono-perspective approach, researchers could also consider employing a multi-perspective approach, integrating the perspectives of at least two groups of actors. The few multi-perspective studies demonstrate that findings differ depending on whether learners or educators are surveyed and underline that educators perceive vocational training to be of higher quality compared to learners' perceptions (e.g., Cully and

⁴ The study classifies dropping out as a downward drop-out, while 'stopping out' encompasses the other three drop-out paths (ibid., p. 472). The presented examples demonstrate the applicability of Fig. 1.

Curtain 2001; Ebbinghaus et al. 2010; Griffin 2017; Jonker 2006; Negrini et al. 2016; van der Sluis et al. 2014; Walker et al. 2012; Wandeler et al. 2011). As could be shown in a multi-perspective study, such empirical differences in perception have a direct impact on drop-out (findings) through the increased potential for conflict in cases where both perceptions substantially deviate. Additionally, these differences can also influence drop-out findings indirectly through the researchers' choice of study design. In the latter case, multi-perspective approaches that integrate the perceptions of trainees and the training personnel appear to be better suited to meet the interactive training reality and, thus, paint a more complete picture of the drop-out genesis. This argument is underlined by, for instance, a stronger correlation of a multi-perspective operationalisation (using differences in perception) of training quality with trainees' drop-out intentions compared to mono-perspective approaches (Krötz and Deutscher 2021a, b). On the other hand, mono-perspective research seems advantageous with regard to their lower (economic) effort and methodological complexity. Researchers should, therefore, weight the possible options regarding their *Sample Perspective* and clearly state the theoretical rationale for the chosen sample (which may also stem from secondary data). The resulting limitations of the chosen Sample Perspective and possible alternative designs should as well be discussed within their studies.

General disciplinary perspectives of drop-out research

The comprehensive list of drop-out reasons from multiple sources as, for example, provided in the meta-analysis by Böhn and Deutscher (2022), but also the above-mentioned multiple stakeholders and the diverging intentions and paths followed after dropping out, highlight the intricate nature of this phenomenon. This complexity requires researchers to adopt a focused and perspective-driven approach to their empirical investigations, leading to the third and final step of this structuring recommendation (illustrated in Fig. 1). By concretizing the focus of their research to one (or in exceptional cases a mixture of two) specific disciplinary perspective(s) on drop-out, the research endeavours can be limited transparently and thereby clarify included versus omitted aspects of the phenomenon. This approach will enable scholars to delve deeper into the complexities of the issue, leading to a more traceable structure of their research efforts and more significant contributions to the literature on this topic.

An exploration of the drop-out phenomenon can take different disciplinary research perspectives (lenses) that vary regarding their explanatory approach and focus on different influencing factors. In the following, based on the typical interests of scientific disciplines, four exemplary perspectives are presented (see also Krötz 2023), structured on three levels: micro- (individuals and interactions), meso- (organisations/institutions), and macro-level (society and framework systems). However, the following overview (Table 1) is not meant to be an exclusive list of research perspectives, further perspectives are possible. The framework contains exemplary influencing factors related to each disciplinary perspective. There are further interesting variables related to each view and, in some cases, variables might be applicable to more than one research perspective. Moreover, the contents of Table 1 are not limited to mono-perspective research focused on learners but can involve other stakeholders, such as training personnel, colleagues, teachers, etc. In the following, each perspective is briefly explained, illustrated by some examples from drop-out research and potentially relevant adjacent topics.

Table 1 Exemplary research perspectives on drop-out from VET (Krötz 2023)

	Economical View	Psychological View	Sociological View	Pedagogical View
Macro-level	Framework conditions on the macroeconomic level, e.g. o General or sector-specific economic situation o Labor market	-	Indirect effects on socialisation by the <i>surrounding systems</i> , e.g. o Education system o Political system o Economic system	Framework conditions in the pedagogical sphere, e.g. o Framework curricula o Training regulations o Outline of training professions
Meso-level	Organisational business figures, e.g. o Profitability/efficiency o Cost-benefit analysis	Dynamics in interaction and communication specific to personality traits, e.g. o Specific group status o Group dynamics	Effects on socialisation by organisational characteristics that influence interactional dynamics, e.g. o Company size o Hierarchy structure o Number of employees	Pedagogical conditions within the training company and at the workplace, e.g. o Number of pedagogically trained staff o Organisational curriculum o Technical equipment
Micro-level	Individual economic situation, e.g. o Individual utility functions o Disposable income o Action alternatives	Personality traits 'inherent' to individuals, e.g. o 'Big Five' (openness, conscientiousness, extraversion, agreeableness, neuroticism)	Personality structures influenced by socio-demographic background and interaction with (a) private life environment and (b) occupational environment, e.g. o Gender o Occupational identity o Organizational identity	Learning development influenced by pedagogical interaction, e.g. o Pre-knowledge o Learning motivation o Pedagogical methods

The first presented view represents an economic perspective. Economists usually consider phenomena such as drop-out as being influenced by the market economy and individual utility functions. At the micro-level, an individual's actions are influenced by its economic situation and resulting action alternatives. The individual value of vocational training is depicted by utility considerations (e.g., Yi et al. 2015). In this regard, financial pressure could lead to contract terminations (Cho et al. 2013; Ernst and Spevacek 2012; Lestari and Setyadharma 2019) as individuals may be forced to work in full-time jobs without completing the training or to seize an offer for an economically better job or training position with regard to wage or travel costs. On the meso-level, for example, the profitability of a training company impacts the utility function for offering training positions and investing in young personnel. Such cost-benefit analyses may produce saving measures as, for example, not investing in new technical equipment or reducing the number of trainers (e.g., Schönfeld et al. 2020), thereby deteriorating the overall quality of training and affecting learners in their considerations to leave the training. Additionally, the company's economic situation influences the company's demand for trainees (Bundesinstitut für Berufsbildung, 2021), which could, besides contract terminations in case of short-time work or bankruptcy, also imply increased demand for trainees and more action alternatives for learners in economically good phases. At the macro-level, macroeconomic framework conditions influence drop-out indirectly. For instance, the economic situation of a training company's industry could deteriorate its market conditions, which would affect its ability to provide training programs negatively during economic downturns. Additionally, the labour market situation would influence drop-out

indirectly by changing alternatives available to an individual (e.g., Backes-Gellner & Tour, 2010; Gambin and Hogarth 2016; Rohrbach-Schmidt and Uhly 2015) and affecting one's decision-making. Lastly, vocational schools' economical scope of action may be limited by political decisions on the macro-level as well, thereby indirectly affecting drop-out occurrences due to lower school-training quality.

As a completely different approach on drop-out, a psychological lens would primarily focus on personality traits, which are individual dispositions that are relatively stable "across context and time" (Roccas et al. 2002, p. 790). Following McCrae et al. (2000), such endogenous personality traits affect an individual's thinking and behavior. It is therefore likely that learners' drop-out behavior is influenced by their psychological dispositions. With regard to the so-called "Big Five"⁵, research indeed revealed relations between personality traits and job satisfaction, job changes, and leadership style (John et al. 2008; Hassan et al. 2016). This view implies that there are potentially common personality traits among learners who dropped out or among trainers and teachers with a higher-than-average drop-out rate. However, such interesting relations are still to be researched. On the meso-level, drop-out research would consider the important interactional dynamics relevant for drop-out decisions that trace back to personality traits. Such meso-level effects of personality are, for example, the individual's networking and behaviour in a group of people, its role and standing, but also its predisposition for conflicts (summarised in John et al. 2008). Within the psychological perspective, there is debate on the role of macro-influences, such as the role of culture for personality, which particular authors, for example Roccas et al. (2002), argue to be relevant. However, the macro-level was left blank due to the perspective's predominant intra-individual focus, including its resulting interindividual effects.

As another example, one could apply a sociological research perspective on drop-out. In this view, professional socialisation theories build the central lens for researchers. Such theories (see e.g., Heinz 1991; Lempert 1998) highlight the socialisation processes during this new life phase for trainees, where they usually enter adult work life for the first time, and its defining influences on trainees' personality structures. Following from socialisation theories, on the micro-level, especially learners' socio-demographic background (e.g., gender, social class, etc.) plays a decisive role for their personality structures. Additionally, interaction with their private and work environment is important for shaping the individual personality, such as developing an occupational and organizational identity. Such socialisation processes rooting in the family- and social-background, thus, form specific values and (occupational) preferences over time (Heinz 1991), which are, in turn, relevant for the individual drop-out behaviour (e.g., the influence on learners' perceptions exerted by their most desired occupation; Cully and Curtain 2001; Krötz and Deutscher 2021a). On the meso-level, this perspective would consider organisational characteristics that influence such interactional socialisation dynamics. Examples would be the size and the hierarchy structure of the training company. Such aspects could affect the way learners communicate with their teachers and trainers, thus influencing their relations and several social drop-out factors.⁶ On the

⁵ The most prominent approach, implying a personality structure of five main traits: openness, conscientiousness, extraversion, agreeableness, neuroticism (John et al. 2008).

⁶ Socialisation processes are considered to happen interconnectedly on the micro- and meso-levels. Therefore, the classification into levels is not always exclusive.

macro-level, surrounding systems influence learners' socialisation (e.g., characteristics of the educational or political systems) and thus could indirectly affect drop-out from VET. Researchers should therefore explicitly state whether such macro-influences are to be considered or excluded within their research.

Lastly, a pedagogical perspective on drop-out would consider pedagogically shapeable aspects within vocational training that relate to drop-out. On the micro-level, this perspective focuses on the pedagogical interaction and how it is shaping the individual learning development. Both pedagogic work (e.g., pedagogical and didactical methods) and aspects of the learning process (e.g., motivation, pre-knowledge, etc.) are known to be related to drop-out from VET (Böhn and Deutscher 2022). On the meso-level, various aspects of the company and the workplace influence the pedagogical conditions within vocational training. Characteristics such as the training curriculum of the organization (e.g., Laporte and Mueller 2013), the quality of technical equipment, and the number of pedagogically trained personnel impact the pedagogical work and, thus, may influence drop-out on this level. Again, on the macro-level, general framework conditions may affect drop-out indirectly. Examples of macro-influences would be the structure and outline for the trained profession and framework curricula, which affect the meso-pedagogical conditions and the individual training reality by predefining specific training contents (e.g., Coe 2013; Karmel and Mlotkowski 2010; Laporte and Mueller 2013). Therefore, researchers need to state the in- or exclusion of such aspects and how they are to be considered.

Conclusion and discussion

In conclusion, drop-out from vocational training programs is a complex phenomenon that can be analysed from different disciplinary perspectives, each highlighting specific influencing factors. To address this issue effectively, researchers and practitioners need to consider the multi-faceted nature of the problem and work interdisciplinary to develop comprehensive interventions that target the various causes of drop-out. The presented framework model (Fig. 1) can aid in organising future empirical endeavours, revealing prevailing research gaps, and enhancing the clarity of researchers' scientific contributions, as well as improving the comparability of studies. It is, thus, recommended for researchers to consider the following three steps (similar to Fig. 1) in order to theoretically and empirically classify their research within VET drop-out research: (1) Clearly state the *target phase(s)* of your drop-out research (Development-/Decision-/Adjustment-Phase) and design a purposive measurement approach. (2) Carefully deliberate the *sample perspective* and choose your sample(s) in line with the research question. Discuss limitations resulting from your decision. (3) Explicitly state your disciplinary background and describe the resulting *research perspective* on drop-out.

Regarding possible disciplinary research lenses on drop-out from VET, this article presented four possible exemplary perspectives (economical, psychological, sociological, pedagogical) and provides a brief illustration of relations to drop-out from each perspective, while other disciplinary perspectives are possible. However, there are interesting perspectives that still remain to be researched in more detail: For instance, a psychological perspective on drop-out from VET still entails several pending questions: What role do learners' personality traits play for drop-out? Do teachers and trainers with

higher-than-average drop-out rates show specific personality traits? How is conflict potential during training influenced by specific personality traits?

A crucial point in interpreting drop-out findings in cross-section is to consider inter-relations of the large number of (included and omitted) variables, as confounding effects (e.g., Gender confounding the influences of mental health; Hjorth et al. 2016) and spurious correlations (e.g., effects of education that may stem from preceding influences such as socio-demographic background, language, etc.; see e.g., Böhn and Deutscher 2022) are no rarity. Therefore, in addition to adopting new perspectives, conducting more longitudinal studies that allow for the exploration of causal relationships between the various factors involved is necessary for scientific and practical advancements in the field of drop-out from VET. One such current longitudinal investigation was conducted by Ma et al. (under review), who analyse the effects of competence development and socio-demographic characteristics on trainees' drop-out intention during vocational training. Further recent longitudinal research related to drop-out and training persistence can be found, for example, in studies by Findeisen et al. (2022), Michaelis and Findeisen (2022) as well as Holtmann and Solga (2023).

Although it presents a challenging hurdle in drop-out research, maintaining contact with learners who have actually dropped out would be helpful in gaining further insights into the causes of drop-out, their future paths, and the statistical relation with their initial drop-out intention. By gaining a better understanding of the predictive relationship between drop-out intentions and drop-out, the challenge of maintaining contact would be less severe. Additionally, employing simple smartphone apps to conduct surveys during training and after drop-out could be one potential method to overcome the obstacle of maintaining contact with learners who have dropped out. In dual systems, such investigations should also include vocational schools, so that effects can be distinguished for both learning venues, training companies and vocational schools. Generally, improving the data situation regarding learners' adjustments paths is an important hurdle for drop-out research (CEDEFOP 2016). 'More effective data-tracking mechanisms to describe the movements of their students in and out of institutions, and across institutions and qualifications' (Callan 2005, p. 4) need to be implemented.

Taking into account the perspective of the sample, multi-perspective analyses continue to be limited in number but have the potential to enhance our understanding of the drop-out phenomenon. As a result, it is crucial to test new and innovative approaches to training quality and the origins of drop-out. Such approaches should be embraced by the research community.

Abbreviations

VET Vocational education and training

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