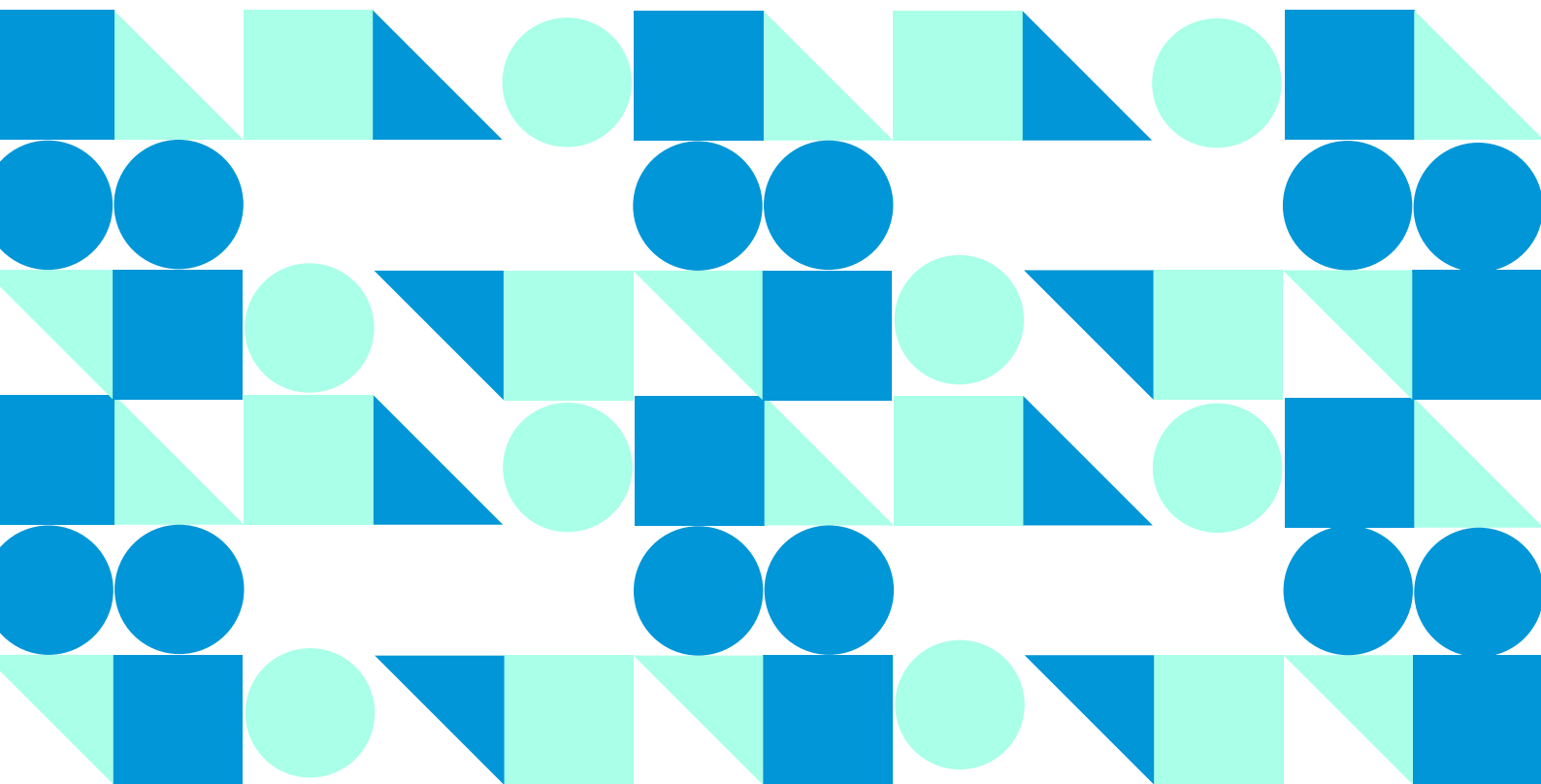




Research paper

The future of vocational education and training in Europe

50 dimensions of vocational education and
training: Cedefop's analytical framework
for comparing VET





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The **European Centre for the Development of Vocational Training** (Cedefop) is the European Union's reference centre for vocational education and training, skills and qualifications. We provide information, research, analyses and evidence on vocational education and training, skills and qualifications for policy-making in the EU Member States. Cedefop was originally established in 1975 by Council Regulation (EEC) No 337/75. This decision was repealed in 2019 by Regulation (EU) 2019/128 establishing Cedefop as a Union Agency with a renewed mandate.

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Foreword

This report was prepared as part of the Cedefop project *The future of vocational education and training in Europe*. Building on and taking forward the findings of the previous project (2015-18) on the *Changing nature and role of vocational education and training in Europe*, the purpose of the research is to gain an in-depth understanding of the future trends in vocational education and training in the 27 Member States of the EU, as well as in Iceland, Norway and the United Kingdom. The project analysed how VET has changed since the mid-1990s and how this influences future opportunities and challenges. The research is divided into five separate but interlinked themes:

- (a) the changing content and profile of VET; epistemological challenges and opportunities;
- (b) delivering IVET; institutional diversification and/or expansion;
- (c) facilitating vocational learning; the influence of assessments;
- (d) delivering lifelong learning; the changing relationship between IVET and CVET;
- (e) European VET; synthesis and trends.

This research report presents a holistic approach to understanding and comparing vocational education and training (VET) systems. It introduces 50 dimensions for analysing VET systems, as well as parts of them, structured according to three overlapping main perspectives: epistemological and pedagogical, education system, and socioeconomic or labour market. These were introduced in the *Changing nature and role of vocational education and training in Europe* Cedefop project.

The analytical framework can be flexibly adapted and applied in any comparative research or international policy learning activity related to VET. It provides a model for how research can support policy. As such, the framework helps to understand different conceptions and approaches to VET that exist within and across countries. It can also point to potential conflicts, for example between social, economic and educational goals, making it particularly useful for policy development.

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The research was carried out by a consortium led by 3s Unternehmensberatung (Austria) and is supervised by Dr Jörg Markowitsch. The consortium includes Ockham IPS (the Netherlands) and the Fondazione Giacomo Brodolino (Italy). The German Federal Institute of Vocational Education and Training (BIBB) supports the project as sub-contractor. The report is based on the contributions by Jörg Markowitsch, Philipp Grollmann and Lorenzo Bonoli.

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CHAPTER 1.

Introduction

Comparative VET research in Europe has taken on a new dimension as a result of the enlargement of the European Union and increased cooperation on education since the mid-1990s. Cedefop was founded in 1975, and there were comparative studies on vocational education and training by other international organisations even before then. However, especially due to the accession of Central and Eastern European (CEE) countries to the European Union ⁽¹⁾, the variety of systems to be considered, and the intensity of research, has increased massively in the last two decades ⁽²⁾.

The need for up-to-date information on VET and policy learning in general has also increased in Europe. This has led to a wealth of comparative studies on VET and VET qualifications ⁽³⁾ and the expansion of databases and online tools ⁽⁴⁾, and also to various country typologies. For instance, the analysis of Greinert and Hanf (2004), based on a cultural-historical approach, recommended Cedefop to distinguish between a dual model (Germany), an education-led model (such as in France) and a market model of education (UK-England) ⁽⁵⁾. However, the assignment of national VET systems to existing typologies runs the risk of overlooking national specificities of VET and of reproducing cultural prejudices. Many typologies are also characterised by the fact that they focus on a specific dimension of comparison, such as the political (governance) structure of a country (e.g. Lauterbach, 2003). More open systems for the analysis or descriptions of countries' VET systems, which do not put entire countries into prefabricated boxes but are nevertheless systematic in nature, tend to be the exception or have not yet become established. However, separate frameworks have emerged for certain subsectors or specific VET topics, such as Cedefop's analytical framework for

(1) For a recent overview on the development of VET in CEE countries, see Tütlys et al., 2022.

(2) With the accession of CEE countries, Cedefop and the ETF had initiated a process of [reflection on comparative methodologies](#), see Grollmann and Sellin, 1999, and Lauterbach and Sellin, 2000. A more recent overview on the role of comparative research can be found in Clarke et al., 2021.

(3) See Cedefop project on [Comparing VET qualifications](#).

(4) For example, the [EU Skills Panorama](#), [EU database on apprenticeship scheme](#), [Financing adult learning database](#) or [NQFs online](#).

(5) Excellent overviews on various VET typologies are provided by Rageth and Renold, 2017; Gonon, 2016; Bosch, 2016.

apprenticeships (Cedefop, 2019a) or their analytical framework for developing upskilling pathways (Cedefop, 2020a). From a policy perspective, these are extremely helpful, well-tested tools for analysing the strengths and weaknesses of a system. In more detail, they appear primarily normative in nature, and to some extent 'simply' translate principles of good governance to the respective area (Markowitsch and Chan, 2021).

To date, there has not been a more general tool that can be used for entire VET systems and/or sub-aspects of them that is more research-led than normative, and that is still suitable for policy analysis. To fill this gap, a framework was designed at the beginning of the Cedefop project on the *Changing nature and role of vocational education and training in Europe* initially to analyse conceptions of VET on a cross-national basis and their changes over time (see Cedefop, 2017a; 2017b; 2020b); it was further developed during the project and later extended to address the specific requirements of the follow-up project *The future of vocational education and training in Europe (2020-22)* whose goals were to deepen Cedefop's understanding of the factors shaping future developments of VET in Europe and to support policy makers and stakeholders in strengthening the overall relevance and quality of VET. It is this framework that is presented and discussed in this report.

While this framework has been specifically designed to serve these two research projects, it may also be useful for any other comparative study on VET. We therefore present here the main elements and design features of this framework, to be used and further developed in subsequent projects. The main benefits of the framework for comparing vocational education and training are:

- (a) it provides a holistic approach to VET systems and integrates many components that are usually not integrated;
- (b) it can be connected to different national or cultural ideas of vocational education and can help to understand them better;
- (c) it allows connections to be made between different levels of analysis and the combination of rough initial assessment with subsequent detailed analysis and explanation;
- (d) it allows for analysing whole VET systems as well as parts of them (e.g. higher VET) as well as specific aspects (e.g. assessment);
- (e) it is flexible, adaptable and connectable to newly emerging issues in VET policy and practice;
- (f) it can be combined with or complement other analytical frameworks;
- (g) it is particularly suited to 'clearing the ground' for policy work and, as such, provides a model for how research can support policy;
- (h) it is a useful aid to structuring policy debates, strategic thinking and scenario development in VET.

The framework helps to understand different conceptions and approaches to VET that exist between and within countries. The consistent application of different perspectives forces us to abandon reductionist positions, to acknowledge different approaches to VET, and to use them as a starting point for comparisons. It can also point to potential conflicts, for example between social, economic and educational goals, and thus is useful for policy development.

There are limitations to this framework, some of which we discuss in detail. However, from the outset it is important to note that the framework presented here is a new tool and not a new theory. Nonetheless, by bringing together and structuring different theories and phenomena concerning VET, it is possible that the tool could become a precursor to a specific theoretical framework of comparative VET research in the long run. To this end, we also need to capture and explain the external and internal drivers of change in VET and how these may impact the future.

The following chapter presents the basic elements of the framework and explains how it was developed. Chapter 3 illustrates how the framework can be further expanded and adapted by taking assessment and the categorisation of knowledge in curricula as examples. Chapter 4 summarises experiences with the application of the framework in different settings. Chapter 5 takes a prospective look forwards to see what research might look like in the future.

CHAPTER 2.

Three-perspective model of VET

2.1. Introduction

Any VET phenomenon examined in comparative settings needs to take into account different perspectives. The issue of expanding work-based learning, for example, has pedagogical or didactical perspectives on how work-based learning can be implemented efficiently and effectively alongside learning in classes, self-study or exploratory learning: how can school and work be coordinated didactically? Education administrations need suitable didactical solutions but there are also organisational and education system issues to be considered: in which programmes should work-based learning be expanded and to what extent; who is responsible for quality assurance; what needs to change in terms of financing to promote work-based learning? A labour market perspective, in contrast, questions whether more work-based learning serves the transition from education to employment or whether it may limit job mobility due to learning being too narrow and job-specific.

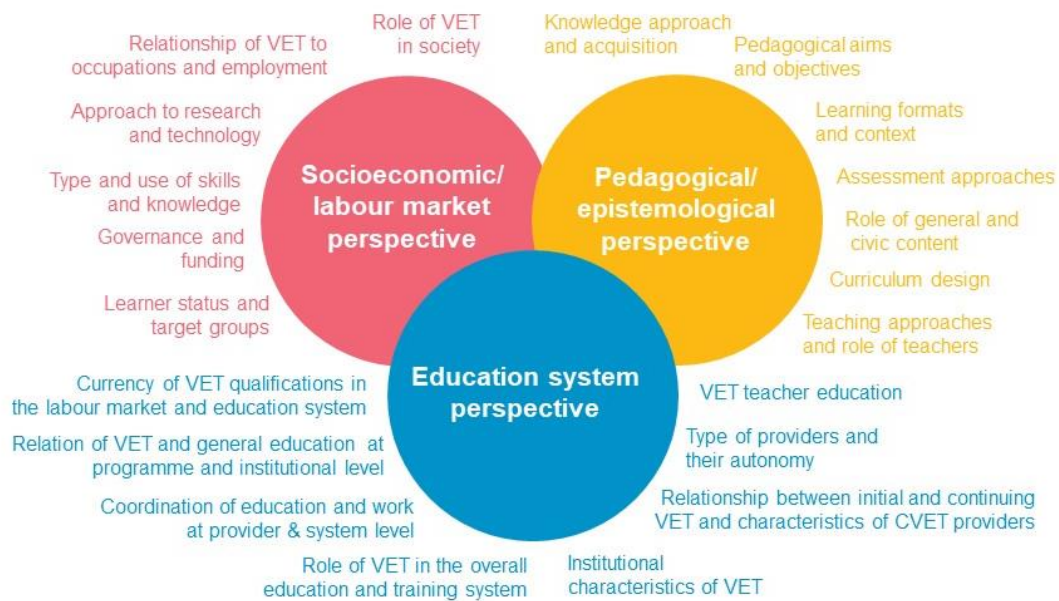
For our framework, we have distinguished three, partly overlapping, main perspectives: an epistemological and pedagogical perspective; an education system perspective; and a socioeconomic or labour market perspective (compare Figure 1 and (Cedefop, 2017a; 2020b)). These analytical perspectives should not be confused with the different purposes that VET usually pursues, which could be broadly categorised as educational, economic and social, and to which we will turn further in Section 2.5.

The epistemological or pedagogical perspective is the view usually taken by educationalists, psychologists and philosophers with a focus on issues of VET pedagogy, including the learning and development of individuals and their learning environment. From this perspective, it can be argued that the identity of vocational education is rooted in distinctive modes of production, representation, use and transfer of knowledge, which can be associated with particular ways of teaching and learning. For instance, in VET the emphasis is on practical knowledge (know-how, skills), which is often implicit, personal and situational. Learning typically involves practical experience (learning-by-doing) and usually happens through a social process, which also requires teachers to act in different roles. However, VET does not exclude theoretical knowledge and the knowledge base that underpins practice differs between VET programmes and the various VET domains.

An education system perspective is the view usually taken by people in education administration, sociologists of education and education statisticians. It looks at the way VET as an institution has evolved and continues to evolve over time. It focuses on system and VET provider characteristics and is reflected in the way VET is represented in international statistics or country reports, the sort of VET at a glance reports. In this perspective, the variety of forms of VET, types of providers, levels, pathways and the nature and scale of VET in the initial (compulsory) and continuing phases of education come to the fore. Relationships with other sectors, such as general education and VET teacher status, education and qualifications, are also of interest.

Using a socioeconomic or labour market perspective, the wider societal functions of VET are considered. This is the view often taken by economists, labour sociologists, political scientists, but also historians, who will be interested in, for instance, the ways in which VET contributes to social stratification by providing access to particular career pathways and to the skills, competences and attitudes demanded by companies and their work systems. It is the status of learners (whether students in education or apprentices holding employment contracts with employers), the funding sources and mechanisms, as well as the types of governance, which are of particular interest here.

Figure 1. **Three-perspective model of VET**



Source: Based on Cedefop 2020.

Key dimensions or issues can be assigned to each of these perspectives. For example, the pedagogical-epistemological perspective needs to look into learning formats and contexts, and teaching approaches as key dimensions. Clearly, and as illustrated in Figure 1, there are overlaps between these perspectives. For instance, governance, funding, the status of learners and VET target groups of are as much issues of the socioeconomic perspective as they are issues of the education system perspective. Learning objectives, formats, outcomes and learning contexts are equally in the focus of the epistemological and pedagogical perspective and the education system view, and so is curriculum design. The types of skills and knowledge and how they are acquired are equally in the focus of the epistemological and pedagogical perspective and the socioeconomic perspective, although the latter is more interested in skills use and the future demand for skills.

These dimensions can be further disaggregated into the different properties of the phenomena being considered according to the respective state of research. For example, assessment can be distinguished into whether formative or summative assessment methods prevail or a mix of the two. This is essentially the approach the framework proposes to structure policy issues and which, with reference to comparable methodologies, can be called a ‘morphological’ approach (Section 2.2).

Whilst the previous project was mainly concerned with national VET systems and structures, the *Future of VET* project has looked at ‘deeper’ levels and phenomena, i.e. changes at provider level, in curricula or assessment practices ⁽⁶⁾. Consequently, we needed a ‘magnifier’ and had to refine the dimensions and indicators used in the previous project. The approach can be compared to photography. Like skilled camera work, it requires several lenses, filters and the right perspective. We need wide-angle lenses when looking at large-scale changes, middle-horizon lenses when concerned with the everyday operation of institutions, and telephoto lenses when examining what happens in the individual classrooms or at workplaces (the different use of telescopes and microscopes would be another possible analogy here). In this regard it is important to mention that some of the dimensions suggested in this model can be applied, i.e. aggregated or disaggregated, at different levels: global versus national, system versus provider, programme versus classroom. Others are more specific to certain levels.

⁽⁶⁾ Also, the original framework (Cedefop, 2017a) had a focus on IVET and particular CVET dimensions were added in the new version. The new framework has 50 dimensions at the top level, while the initial one had 17.

In the next chapter we continue these methodological notes by providing more details. We will then introduce the use of our ‘wide-angle lenses’. In Chapter 3 we will show how to zoom in and out on assessment and the knowledge approach.

2.2. Methodological note

As regards the three perspectives and their key dimensions, the framework builds on other conceptual frameworks, in particular on works by Rojewski (2002; 2009), Moodie (2008) and Billett (2011). In designing the method, we were inspired by the so-called morphological analysis of Fritz Zwicky (Box 1). This analysis is a systematic heuristic creativity technique for fully grasping complex problem areas and considering all possible solutions, limiting bias as much as possible. Roughly paraphrased, it argues that classical science can make predictions about future events, but has not been able to demonstrate with any degree of certainty any long-term developments which relate to the character of yet unknown laws of nature and new manifestations. Deterministic and probabilistic methods become useless beyond a certain time and complexity horizon. These considerations make Zwicky’s approach interesting for foresight studies and scenario development in social science, for which he has gone largely unnoticed so far ⁽⁷⁾.

At the core of the morphological analysis is a multidimensional grid (morphological box) that describes all possible features of a phenomenon. The method can be compared to the approach of facial composites using feature-based selections (identikit), reconstructing a picture of a person from strips showing facial features such as variants of head shades, noses, eyes. In a first application of the approach, we produced ‘identikit pictures’ for the VET profile of all EU Member States, Norway and Iceland based on a limited set of components and looked for similarities among them (Cedefop, 2017a). Given that the number of possible VET profiles is astronomical, it was not surprising that not a single identical country pair was identified. Nevertheless, building on them, we could identify some common patterns, as discussed further in Section 4.1.

Certain aspects of the idea of the morphological box have also been suggested by previous comparative education research, although without explicit reference to Zwicky. For instance, Bray and Thomas (1995) proposed to approach comparative studies by looking at a cube with three dimensions: a geographic/location one distinguishing world regions/continents, countries, states/provinces, districts, schools, classrooms and individuals; a second non-

⁽⁷⁾ An exception being Norwegian and Swedish defence research, see for instance Johansen’ 2018; Ritchey, 2011. Zwicky’s approach has also been used in CVET research by K apflinger, 2011.

location demographic dimension, including ethnicity, religion, age, and gender, as well as an entire population; and a third dimension that embraces aspects of education and of society, such as curriculum, teaching methods, finance, management structures, political change, and labour markets. This and similar approaches can complement the framework suggested here when needed. However, the special feature of our model, for example in comparison to the Bray and Thomas cube, is that it also combines different theoretical and disciplinary perspectives and proposes basic characteristics for central dimensions instead of merely naming the dimensions of analysis.

Box 1. Morphological box by Fritz Zwicky

Fritz Zwicky, who is primarily known for his work in astrophysics ⁽⁸⁾, has developed a specific morphological analysis in order to obtain a clear and comprehensive picture of a problem; it offers a general method for structuring and investigating the total set of relationships contained in multi-dimensional, usually non-quantifiable, problem complexes. His 'morphological box' or 'Zwicky box' is also a heuristic cognitive tool and a creativity technique to generate new solutions in a participative way that cannot be achieved by means of classical scientific predictions.

The general idea of the morphological box can be illustrated by the following example (Table 1) from Zwicky in which he discusses the concept of law as 'certain definite code of conduct'. He presents the 'oversimplified array' below, admitting that it would take a 'competent group of experts in many fields and of universal outlook to establish a suitable morphological box of all possible major types of conduct' (Zwicky, 1969, p. 164).

In the first examples he gives 'The United States of America attempts to force its democratic way of life, as they understand it, upon the people of some small nation, and they are subsequently reprimanded for this action by the General Assembly of the United Nations. This case would be formally described by the matrix (P₁₁, P₂₃, P₃₂) because the intended action was dictatorial in character, it was undertaken for the purpose of having the little nation in question recognise and appreciate the value of a certain concept (P₂₃=concept of American democracy) and finally was condemned (P₃₂=punished)' (Zwicky, 1969, p. 165). In the second example a group of engineers, using the morphological method, construct the best bridge possible to cross a certain river at a prescribed location and is honoured by the National Academy of Applied Sciences. Such a project would be described by the matrix (P₁₃, P₂₁, P₃₃) because the engineers have proceeded with the greatest objectivity (P₁₃), the standard involved was the construction of a material (inanimate) object (P₂₁) and the achievement was honoured (P₃₃). Zwicky goes on discussing the problem of justice in the space age and other configurations of parameters. What is interesting is that, besides describing existing cases, the method can also be used to create new cases or find new solutions.

Source: Cedefop.

⁽⁸⁾ See for instance the recent biography by Johnson Jr (2019).

Table 1. **Morphological box of codes of conduct**

P1 Conceptual Character	P11 Dictatorial	P12 Mutual Consent	P13 Absolutely Objective
P2 Qualitative character of the standard	P21 Body animate, inanimate	P22 Phenomenon	P23 Concept
P3 Consequences of deviations from the code	P31 None	P32 Destructive (punishment)	P33 Constructive (reward)

As stated by Zwicky for the example in Table 1, the decomposition of a country's VET system or a specific VET issue requires appropriate expertise and a comprehensive review of the state of research. The selection of the individual dimensions and properties is by no means arbitrary and must ultimately also make sense for the users, practitioners and policy makers.

The list of dimensions that we developed in our framework using this approach is not comprehensive; we could have added several that look equally relevant. We could have been more specific on target groups, adding young school leavers, women returning to working life, or the long-term unemployed. Selectivity of access, indicating whether programmes are selective according to prior educational performance or if there is no selection at all, and also if companies are in charge of selection, could also be considered. Hence, the list of dimensions and characteristics of VET could be easily extended and developed into an even more comprehensive system for describing VET subsystems, programmes and individual topics. In some cases we did so as will be shown in Chapter 3. However, in the first place our aim was to get the broad picture and a broad overview on dominant national conceptions of VET. Once established, the morphological box provides a common basis for discussion, promotes clarity of communication between people in research and policy-making, and helps to avoid misunderstandings.

This also makes simplifications necessary. For this, we have often chosen dichotomous categories, although we are aware that the world is not black and white. For instance, assessment is rarely either summative or formative only, but mostly a combination of both. In some cases, the chosen categories can be considered a continuum illustrated by contrasting poles, and it not been our intention to propagate a dichotomous view of the world (Cedefop, 2022a, p. 23f). In other cases, we have chosen more than two distinct categories in order to cover the multiple types of phenomena within a dimension. When developing categories for our dimensions we used a wide review of research on the topic across national discourses.

Andrew Sayer (1992) claims that a problem with dualisms is that meanings or associations on each side of the dichotomy 'leak' into each other, so that a phenomenon becomes either one thing or another, without the possibility of examining the complexity in each, or without the possibility that there may be alternative positions. In debates about competence-based education in Australia, Canada, South Africa, the UK and the US, this has led to a situation of 'you are either for us or against us'. The concept of competence in the European continental discussion has quite different implications, since it is not associated with breaking down skills into the smallest possible units and rather refers to a wider human potential to act. It does not provoke such considerable discussion.

Similarly, the debate over modern mathematics education in the US (traditional versus reform approaches to teaching mathematics) has led to a situation which has become known as the 'math wars' (Klein, 2007). This contrasts open, exploratory and learner-centred approaches to teaching that lead to uncertain learning outcomes, with those that achieve better results using more closed, teacher-centred frameworks. In general, open Deweyan approaches⁽⁹⁾ to curriculum were criticised for ineffectiveness in supporting weaker learners in achieving the standards required. Those in favour of such open formats would claim that rigorous academic standards, including large-scale assessments (Ravitch, 1995) which were introduced to tackle the problem of leaving learners behind, would no longer allow for the innovative and integrated teaching practices and teachers' freedom that were the basis for modern democracy (Journell, 2007). This debate finds an equivalent in the discussion around *Handlungsorientierung* (action-oriented approach) in German VET, as a concept that is indigenous to the field of vocational education and training research. Using empirical research (Nickolaus et al., 2005), instructional approaches based on *Handlungsorientierung* were criticised as inappropriate for weaker learners and amplifying differences between learners' cognitive starting positions.

In this research, we are neither advocating for a certain side – open learning formats or more teacher centred concepts of instruction – nor do we consider one approach better than the other. We use these as analytical concepts provided by research to identify possible differences between countries.

The three-perspective model and the related grid of categories appeared for the first time in 2017 (Cedefop, 2017a). We present here a revision of this model, effectively its second release. Therefore, we focus hereafter mainly on the new dimensions and categories of the model, the added or more precise dimensions,

⁽⁹⁾ John Dewey (1859-1952) opposed traditional forms of learning such as learning by passive reception and learning for school and instead advocated learning by doing and learning for life.

and do not repeat all the considerations that went into the selection and justification of the dimensions. More information and background on the various dimensions that have already been used in the original framework can be found in Cedefop (2017a) and the reader may want to consult this research paper first to comprehend the genesis of the model. Finally, we would like to emphasise that the strength of the model does not lie in finding new crucial dimensions of VET, but in a holistic approach which allows us to look at the various elements of VET from different but combined perspectives. It is important to emphasise this because it is clear that all the dimensions of VET presented below have been analysed and discussed in much greater depth elsewhere, but rarely together in one place.

2.3. Education system perspective

The dimensions listed by the previous model under the heading of the education-system perspective were those that education statistics and administrations consider central in their monitoring: education levels, age, access rights, types of qualifications, type of providers and also the parity of esteem between general and vocational education.

Since this project is interested in how delivery of IVET has evolved, and particularly how institutional changes have influenced the relationship between vocational and general upper secondary education, additional dimensions were needed. We needed an indicator that could at least roughly determine the relationship between vocational and general education at programme and provider levels and the relationship of VET and higher education (i.e. whether a distinctive higher VET sector exists). Further, we needed to bring in the sort of feedback mechanism connecting the world of work and world of education which could be considered at school/provider level and system level. Next, we added various dimensions on VET teacher education and recruitment, as this often does not just reflect but consolidates institutional differences at upper secondary level.

Finally, we put the general aims of a VET system at the top of our list. To what extent does a VET system pursue effective skills-matching and serve labour market demands, or adequate education offers for learners in terms of their interests or support to individual careers? Though there is usually a mix of these aims, it is interesting how VET systems differ according to these aspects and how they have changed over time in this regard. These aims may be rooted in deeper and more general values and may become a matter of debate when the quality of VET systems should be assessed. Is there an emphasis on efficiency, effectiveness and responsiveness, is it the resilience, legality, and sustainability which are emphasised, or is the focus on permeability, inclusiveness and equity

and thus the learner? Again, there will be usually a mix of these values but, for comparative purposes, it is relevant to determine this balance, for instance by applying discourse analysis to key policy and legal documents or by conducting empirical surveys among VET stakeholders.

To determine changes in the relationship between vocational and general upper secondary education at programme and provider level we drew on Basil Bernstein's concept of classification already used for subjects. Where classification is strong, there are strong boundaries between vocational education and general education (GE) and they are well insulated from one another (separated). Where classification is weak, there are blurred boundaries between vocational and general education (integrated). Applied to the programme level at upper secondary level, that means that VET and general education programmes are clearly separated, the one focusing on career development and job entry, the other on preparing students for higher education; or integrated combining career development and preparation for higher education. The analysis of national enrolment figures in the previous project provided us with an idea of the extent of vocational and academic drift at upper secondary level. However, this was based on the actual, or at least assumed, separation of VET and GE programmes. Incidences of integrated programmes were reported, but not systematically addressed. In addition to the shifts in enrolment which have taken place between VET and GE programmes, we are also interested in possible changes in the ratio of separated and integrated programmes.

The same distinction can be made at provider level where it becomes trickier than at programme level, because the boundaries may refer to different entities. These are, for instance, the provider as legal entity, the provider's facilities (the school building) or the internal structure, such as departments and the programmes offered (referring to the programme level). In many European countries, schools can roughly be divided into those which offer exclusively general programmes (classical or modern gymnasiums), those which offer exclusively vocational programmes (VET schools) and those offering both programmes. It may well be that a gymnasium and VET school share the same site and facility but are still different legal entities with separate staff and under different leadership. Equally, we could think of a vocational gymnasium (integrated programme, integrated school) with clearly separated departments and teaching staff either for general or vocational subjects. As the examples show, it can be challenging to decide whether an institution should be regarded as separated or integrated, and even more so to compare this between countries. Therefore, it is preferable to concentrate on the dynamics of change within a country rather than comparing the status quo between countries. Are there signs of better integration of general and

vocational education as regards school locations, facilities and departmental structures, or are there tendencies to separate them further?

Similar to the way we discussed the crossing of boundaries between learning at school and learning at work from the pedagogical perspective of the individual learner, coordination between education and work could also be seen through the lens of the education system perspective. In this respect questions of governance at provider level and at system level come to the fore. Simplified, we can distinguish between weak and strong interaction and coordination at the two levels. Strong interaction and coordination at provider level would be characterised, for instance, by regular cooperation with (local) businesses (e.g. providing internships, apprenticeship places, staff exchange, company excursions, sharing of facilities or research and development projects), business representatives in school boards, and part-time teachers from industries. Strong interaction and coordination at system level would be the involvement of employers or employer organisations and unions in curriculum design and assessment, as well as the overall steering or operating of the respective VET sub-system. These forms of interaction and coordination have been discussed in the literature as forms of duality (Grollmann, 2018) and forms of feedback mechanism (Cedefop, 2009 and 2013; Markowitsch and Hefler, 2018).

Even with quite basic distinctions (strong/weak, integrated/separated), the combination of the dimensions offered can very quickly lead to more complex models. For instance, by combining the 'interaction between education and work at provider and system level' with the question of the main provider, sources of funding and governance (Chapter 3), the four types of feedback mechanism suggested by Cedefop (2013) (statist, participatory, liberal, coordinated) as well as the frequently cited types of skills formation systems suggested by Busemeyer and Trampusch (2012) (statist, segmentalist, liberal, collective) can easily be simulated.

Table 2. **Dimensions and categories of the education system perspective**

Role of VET in the overall education and training system			
1. Education system aims	Securing effective skills matching	Securing adequate educational offers for learners	Developing capabilities for individual careers
2. Quality criteria and values	Efficiency, effectiveness, responsiveness, competitiveness, accountability	Robustness, resilience, legality, sustainability	Transparency, permeability, inclusiveness, equity, learner-orientation
3. Parity of esteem / VET status	Higher or equal compared to general / academic education		Lower than general / academic education
Relation of VET and GE at programme and institutional level			
4. Organisation of VET / GE at programme level	Separated (either career development/vocational or general / HE preparation)		Integrated (combining career development and HE preparation)
5. Organisation of VET / GE at institutional level	Separated		Integrated
6. Coordination education & work at provider level	Strong interaction and coordination		Weak interaction and coordination
7. Coordination education & work at system level	Strong interaction and coordination		Weak interaction and coordination
Institutional characteristics of VET			
8. Level of education	Mainly lower level (i.e. ISCED level 2, EQF level 2)	Middle level of education (ISCED level 3-4, EQF level 3-4)	Middle level and some higher VET (ISCED level 3-5, EQF level 3-5)
9. Age	Adolescent / young people (15 to 19)	Young adult / adults (18-24)	No particular age group
Type of providers and their autonomy			
10. Key providers	Companies	Schools/ VET institutions	Further and/or higher education providers
11. Organisational autonomy of IVET providers	High autonomy		Low autonomy
12. Curriculum autonomy of IVET providers	High autonomy / flexibility		Low autonomy / flexibility

Currency of VET qualifications in the labour market and the education system				
13. Outcomes/destination	Occupational qualifications or rights	Educational qualifications/ access rights to higher levels of education	Occupational rights and access rights to higher levels of education	No specific occupational rights/rights for progressing in education
VET teacher education				
14. VET teacher education	Additive/consecutive (pedagogical skills added to vocational skills)		Integrated/parallel (pedagogical skills and vocational skills developed in parallel)	
15. VET teacher status	Low status (relative to other teaching professions)		High status (relative to other teaching professions)	
16. VET teacher recruitment	Formal / academic qualifications (including work experience)		Experience- / expertise-based, alternative recruitment	
Relationship of IVET with CVET and Higher VET and characteristics of CVET providers				
17. Position of Higher VET	Distinctive higher VET sector		Higher VET as part of higher education	
18. CVET purpose (subject-orientation and qualification-orientation)	Leading to a formal qualification	Leading to acquisition of specific vocational/ occupation-specific skills but no formal qualification	Basic skills training	General education tracks (academic tracks and second chance)
19. Institutional legitimacy	Legitimacy derives from formal IVET/HE system		Legitimacy derives from value of the credential in the occupational and professional fields	
20. Organisation and governance of CVET providers	CVET providers are strongly State-led (State-governed)		CVET providers operate with a high degree of autonomy (non State-governed)	

Source: Cedefop.

In the pedagogical perspective we look at teachers and trainers from the point of view of learners, asking what their role is in relation to the learner. In the education-system perspective we are interested in the governance of teacher education, as this influences the way VET is structured and delivered: we are interested in VET teacher education, recruitment and status. As with research on VET teacher knowledge in general (Loo, 2020) comparative research on VET teachers, their education and roles, is still scarce (Grollmann, 2008; Kuhlee and Winch, 2017), and it is not obvious which indicators are best for our purpose. We consider the status of VET teachers (low or high) in relation to other teaching

professions or professions in general as informative regarding the overall status of a VET system. In terms of the relationship between VET and GE, the type of recruitment can be a strong indicator. Is there increasing emphasis on formal academic qualifications (including some work experience) or are alternative recruitment procedures based on experience on the rise? Hence, the issue of 'dual-professionals', teachers and trainers who combine occupational expertise and excellent teaching and learning practice ⁽¹⁰⁾.

The organisation of teacher education is a broad field; even within compulsory teacher training it is a complex field for comparative education research. The variety within VET teachers' education is even more challenging, and a possible reason why there is little research. Besides the different types of VET teachers, another crucial aspect is the way in which VET teacher education is embedded or related to teacher education for general education. Differentiating these factors in detail would require a sub-framework for teacher education similar to the one we suggest below for assessment. Instead, we propose another central distinction: whether VET teacher education is organised additively and consecutively (pedagogical skills are added to vocational skills or vice versa) or integrated and in parallel (pedagogical skills and vocational skills are developed in parallel, as with the concept of dual professionals). Recruitment procedures and VET teacher education programmes are often based on the qualifications of graduates in the respective subject matter (e.g. engineering) and pedagogical training is added. However, there are designated vocational teacher education institutions with integrated programmes, which were upgraded to academic institutions only recently. Sometimes 'high status', necessary to secure the attractiveness of vocational teaching roles, correlates with designated and highest-possible qualifications; at the same time, teacher gaps and the actual tasks of vocational teachers might require alternative patterns of recruitment based on experience in the respective occupational field. Countries and jurisdictions handle this problem quite differently and the three dimensions allow categorising different patterns found.

While the initial framework was biased towards IVET, we aimed in the revision to reflect better the interrelationship between IVET and CVET by introducing three new dimensions (Cedefop, 2023, forthcoming). CVET is conceptualised as the learning of adults after leaving initial education and, as such, is an umbrella term for different forms of educational provision. A rough distinction can be made between CVET oriented to vocational or occupational skills and competences and

⁽¹⁰⁾ A similar question has already been dealt with in the previous project but limited to higher VET (Cedefop, 2019b). This is an issue which university systems also handle differently.

CVET oriented to basic skills (e.g. literacy training) and general education. A further distinction can be made between CVET leading to a formal qualification or credential that is included in the formal educational system and/or the national qualifications framework, and CVET not leading to such a formal qualification.

Another important CVET-related dimension is how the organisations offering adult learning acquire institutional legitimacy in order to provide recognised credentials (Hefler and Markowitsch, 2013). Institutional legitimacy can come from the education system or from occupational and professional fields. This is especially advantageous for understanding the relationship between IVET and CVET. The legitimacy of programmes and certificates from IVET providers is often based on the status of the institutions (as school and colleges). In contrast, the legitimacy of the programmes and certificates offered by private training providers depends greatly on the status of the provider in the respective professional and occupational field. There are also different quality assurance frameworks that contribute to legitimising those private training providers and their programmes and certificates. Hence, it can be the case that IVET provides legitimacy for CVET, though CVET can be organised completely separately from IVET providers.

A third dimension, linked to the question of legitimacy, looks at whether the providers of CVET programmes are under some form of State governance or whether they operate as autonomous bodies. Education providers like higher education institutions or VET colleges generally fall under some form of national inspectorate. Providers like private training organisations, sectoral organisations or employer-led training organisations have a different level of autonomy to operate in an open CVET market. This dimension thus explores the extent to which CVET is subject to State control. The extent to which CVET providers are State-led might increase or decrease the possibilities for IVET providers to operate in CVET.

2.4. Socioeconomic perspective

Dimensions from the first version of the model included sources of funding (private or State, from education or labour market budgets), learners' identities or legal status, occupational hierarchy, governance (led by industry, organised business/trade or the state), the focus of VET (entry into working life, a broad preparation for changing requirements across working life or becoming a member of a professional community). A particular dimension, which we have called the 'context of justification', has provoked some discussion: we have tried to rephrase this dimension as the 'societal aims' of VET, which basically describes the different roles VET may play or have attributed to it in society. We distinguish three broad aims: educational, economic and social. Developing the economy, promoting

innovation and economic growth mainly by securing the supply of skilled labour can be considered an economic aim. Promoting social cohesion and reducing societal inequalities, for instance by promoting social and educational mobility and by combating (youth) unemployment, is a key social goal of VET. Promoting political participation and citizenship can be considered an educational aim. Although these aims are always present, they vary depending on the country and the period ⁽¹¹⁾. The balance of these aims over time could be studied by using discourse analysis, but the curriculum may also offer hard indicators for this purpose, for instance the extent to which and how civic education, civic or general studies form part of the vocational curriculum (Lappalainen et al., 2019; Nylund and Virolainen, 2019). We consider the relationship between these aims a crucial characteristic of a country's VET system. However, these three aims should not be confused with three analytical lenses we propose here.

The dichotomy of occupational versus organisational space (Maurice et al., 1986) has guided our initial reflection on a country's specific conception of VET from a labour market perspective (see also Cedefop, 2017a) just as the dichotomy of the cognitive and tacit knowing view guided our reflections for the epistemological perspective (Section 2.5). When organisational space dominates, firms tend to organise work processes in an idiosyncratic way, with large differences in work organisation and job demands between firms, even when producing or providing similar products and services. Workplaces are shaped with little consideration for the content of qualifications and experiences of job holders. Most jobs do not require IVET and learning usually takes place on the job or in short spells of off-the-job training. Typically, workers deal only with routine tasks, while any exceptions to the rule are addressed by technicians or managers. The latter are qualified to post-secondary or tertiary level and often hired directly after graduation. Wage differences between unskilled and skilled workers, on the one side, and professional groups (technicians, managers) on the other are considerable. For VET it is particularly interesting to look at complementarities of forms of work organisation (Holm et al., 2010) ⁽¹²⁾ and other socioeconomic

⁽¹¹⁾ For an example of the historic analysis of these three aims compare Bonoli and Gonon, 2022.

⁽¹²⁾ Work organisation is about how work is divided into job tasks, bundling of tasks into jobs and assignments, interdependencies between workers, and how work is coordinated and controlled in order to fulfil the goals of the organisation. Based on a cluster analysis of EWCS data from 2005, the Eurofound report from 2009 characterised four forms of work organisations by several traits: discretionary learning; lean production; Taylorist; and traditional or simple. The report suggests that modern or advanced forms of work are associated with discretionary learning and lean production patterns. These forms are characterised by high levels of autonomy in work and decentralised structures, high involvement and responsibility of employees, task

dimensions. For example, organisational space might fit well with simple and Tayloristic forms of work organisation, and not so well with lean models of production.

When occupational space dominates, firms organise work processes by benefitting from broad and standardised vocational qualifications, which allow graduates to perform a multitude of job roles. Workers are less attached to (chains of) workplaces but function as parts of multiple-skilled, self-organising teams, of novice and experienced workers, which can deal with both routine and extraordinary workplace requirements. When occupational space dominates, discretionary as well as lean modes of work organisation could be most likely to be applied. Workplaces and skill demands are much more similar across firms in similar sectors or producing the same products and services. Workers holding a vocational qualification can change firms without seeing many of their skills becoming obsolete. Wage differentials between vocationally skilled workers and employees with post-secondary and tertiary education are comparatively low, as pay for vocational skills is comparatively high. IVET at upper secondary level is a key part of the education system and enjoys high prestige.

These ideal types of organisational and occupational space help us to understand better how the various elements we distinguished in the socioeconomic perspective of VET, such as the occupational hierarchy, the coordination between businesses or the purpose of VET, are connected.

However, to be able to understand better how technological change at work (in particular digitalisation, automatisisation and robotisation) is reflected in VET curricula and what role research-based knowledge plays in today's VET provision, further dimensions are needed, and have been added in this revised version of the model. These are the relationship of VET to knowledge production, VET's approach to technology and innovation and the way work organisation, types of employment and the recruitment of VET graduates are reflected in curricula.

A seminal knowledge production distinction, made by Gibbons et al. (1994), into Mode 1 and Mode 2 research is helpful. Mode 1 is motivated by scientific knowledge alone (basic research) founded on a conceptualisation of science as separated into discrete disciplines. In Mode 2, interdisciplinary teams are brought together for short periods of time to work on specific problems in the real world (applied research). The two modes of knowledge production also differ in many

complexity and job rotation, quality management or high presence of (autonomous) teamwork. In comparison, the Taylorist and traditional forms of work organisation are characterised by bureaucratic features, low autonomy in work, along with scant training, simple tasks or a high presence of informal and non-codified working methods.

other aspects, such as funding, quality control or social accountability. In principle, it can be assumed that VET is primarily involved, if at all, in Mode 2 knowledge production and only marginally in Mode 1 (e.g. skilled workers producing equipment in laboratories and workshops of research universities). However, just as the emergence of universities of applied sciences (polytechnics) in the last quarter of the 20th century in Europe have accelerated the Mode 2 production of knowledge, evolving centres of vocational excellence (CoVEs) have the potential to change the current understanding of knowledge production.

Curtain has argued that the scope for VET to be involved with ‘pure’ science-based research that might lead to radical innovation is likely to be small, since this terrain is where higher education excels (Curtain, 2004). VET may also have a role to play in applied research: Beddie and Simon note the potential to involve VET learners in such projects, which will enhance learning and lead to a more innovative workforce (Beddie and Simon, 2017). However, involvement in applied research might be more applicable to higher-level VET rather than VET in general.

Arguably the greatest potential role for VET is in technology diffusion, especially to SMEs. As Curtain argues, the role of such diffusion is not to be underestimated since the dissemination and adaptation of new technologies from knowledge-intensive to mainstream industries are central to the spread of innovation. Industries like food-processing, timber and textiles have low R&D but make use of knowledge-intensive inputs. Curtain states: ‘From the perspective of innovation as a series of small changes diffused widely, vocational education and training has much more definable role’.

Perhaps more important than the question of what influence VET has on Mode 1 or Mode 2 is the role of VET has within these forms of knowledge production and how technology and innovation are approached in the respective VET curricula. Is it purely instrumental or is it a developmental role in which VET is considered an important partner in the (co-)design of technology? A both entertaining and significant example of the latter approach is the RoboCup⁽¹³⁾ or Robot soccer world cup, an annual robotics competition in which many vocational colleges – by driving innovation – successfully compete with universities.

When talking about innovation and research, we should not forget the role of VET research, i.e. research about VET rather than VET’s role in supporting scientific/applied research. Is VET research strongly institutionalised, for instance in terms of legally established and sufficiently funded VET institute(s), or is it fragmented, dependent upon the interest of a few independent academics and little related to VET policy?

⁽¹³⁾ [RoboCup Robot competitions](#).

Knowledge production and innovation are linked to work organisation as discussed above. For instance, Arundel et al. (2007) have shown that in countries where workers have a high degree of discretion, firms tend to develop innovations in-house; for countries where learning and problem-solving on the job are more constrained and little discretion is left to the employee, firms tend towards supplier-dominated innovation strategies, which means incorporating innovations from others. However, the preparation for particular types of work organisation is rarely an explicit curriculum goal; however, it could be used as a proxy for different forms of VET by analysing in which types of work settings VET graduates are finally employed. The same is the case for the type of employment and workers' relationship to the organisation. There is unlikely to be a VET curriculum that claims that it prepares students for marginal and short-term employment or aims at equipping students with the necessary skills for crowd-working and the gig economy. Nevertheless, it makes us consider the type of employment as a relevant target category for VET and to monitor the degree to which VET graduates find themselves in self-employment (including as entrepreneurs) or in lifelong or short-term (marginal) employment.

While the type of employment is usually not explicitly used in defining curriculum goals, the orientation to business processes, in contrast to single jobs, job-descriptions or tasks, is an explicit VET curriculum approach which has gained increasing relevance over the last two decades. In the 1980s and 1990s, a new discussion on the organisation of companies began in the context of appropriateness of Asian management concepts for western companies; this has consequences for the content of VET programmes and the way that they are delivered. For example, in Germany orientations towards customer orders and/or business processes have become design principles for training regulations and vocational curricula (Fischer and Bauer, 2007; Gessler and Howe, 2015) as well as in work-based learning. This sometimes involves making troubleshooting part of the curriculum, as well as rotating the job in the course of an apprenticeship in order to develop a holistic understanding of the value chain. This extends more job- or task-centred approaches that are narrowly focused on specific workplaces. This distinction not only relates to work organisation but is equally important for assessment and accreditation of learning. This directly leads us to the epistemological and pedagogical perspective, which we turn to in the next section.

Table 3. **Dimensions and categories of the socioeconomic perspective**

VET in society			
21. Societal aims	Developing the economy, promoting innovation and economic growth; mainly by securing the supply of skilled labour	Promoting social cohesion and reducing societal inequalities; mainly by promoting social/educational mobility and combating (youth) unemployment	Promoting political participation and citizenship; mainly by engaging in labour and citizen movement
22. VET's aim upon graduation	(Re-)entry into working life / entry level	Broad preparation for changing requirements across working life	Becoming a member of an occupation or profession
Approach to research and technology			
23. Role of VET research (in relation to policy)	Weakly institutionalised, isolated	Monitoring and accompanying research	Strongly institutionalised and triggering reforms
24. Approach to technology and automation	Developmental – (Co-)Design of technology		Instrumental – use and application
Type and use of Skills and Knowledge			
25. Type and portability of knowledge and skills	Highly portable generic and transversal skills as well as common knowledge	Domain-specific skills and canonical occupational knowledge that are portable between workplaces within the same occupational domain	Situational, local knowledge of organisations and organisational procedures with limited portability
26. Work organisation	Discretionary learning	Lean production	Taylorist
			Traditional or simple
Relationship of VET to occupations and employment			
27. Type of employment, recruitment & relationship to organisation	Sustainable, lifelong employment, commitment, employee commitment	Crowd working, marginal, short-term employment	Entrepreneurship; start-ups
28. Occupational hierarchy	Semi-skilled workers	Skilled workers	Technicians/professionals/para-professionals
			Managers, entrepreneurs
Governance and funding			
29. Sources of funding	Mainly by companies	Mainly by the State – education budget	Mainly by the State – labour market / social security budget

30. Governance	Low coordination – industry led	High coordination – led by organised business or business/trade unions	High coordination – State-led
Learner status and target groups			
31. Learner status/identity	Student	Apprentice or novice worker	Worker
32. Target groups	Serving predominantly people with disadvantages and low-achievers	Serving both excellence and people with disadvantages / from disadvantaged backgrounds	Serving exclusively excellence and high achievers

Source: Cedefop.

2.5. Epistemological and pedagogical perspective

The epistemological perspective offers a broad distinction between a ‘tacit knowing view’ and a ‘cognitive view’ (Neuweg, 2004) ⁽¹⁴⁾. A cognitive view understands knowledge or information as know-that and emphasises that it is mainly explicit, abstract, standardised and impersonal. In contrast, the tacit knowing view understands knowledge as know-how or experience, and emphasises that knowledge is mainly practical, implicit, personal and situational. So an approach to knowledge which emphasises theoretical, subject- or disciplinary-based can be distinguished from an approach which emphasises practical, experience-based knowledge.

While this basic distinction seems sufficient as a general characterisation of the VET approach to knowledge, it is too limited to investigate the increasing importance of transversal skills, such as entrepreneurial skills or civic competences in VET, which we aimed to elaborate on in Cedefop (2022a). In this project, we discussed various ways to have more detailed knowledge categorisations. One, developed by Wittig (2022) for this project, combines the distinction between practical and theoretical knowledge with the distinction between specialised and non-specialised knowledge, following Hordern (2016); this, in turn, is based on Basil Bernstein (2003), Winch (2010) and Michael Young (2008b). However, no satisfactory solution was reached on this issue, so discussion and work goes on, as explained in Section 3.3 ⁽¹⁵⁾.

⁽¹⁴⁾ Based on Ryle (1949) and Polanyi (1958).

⁽¹⁵⁾ The pragmatic solution we applied to curriculum analysis in Cedefop (2022) was to distinguish between practical/theoretical, general/vocational and in/outside school, which resulted in four relevant categories frequently used in national curricula in Europe: learning general subjects in classrooms (general knowledge); learning

The tacit knowing and cognitive views are clearly reflected in the approach to knowledge acquisition, also often dominating pedagogical and didactical issues such as the teacher's role, the teacher-learner relationship, the control over learning and the approach to assessment, but not identical with those dimensions. In the tacit knowing view, learning means having practical experiences (learning by doing) and is seen as a social process that happens through socialisation in communities of practice. Teaching mainly means creating a learning environment in which students can gain experience (self-directed, student-centred learning) and teachers and trainers may see themselves more as facilitators, coaches, moderators or advisers. Assessment is regarded as part of learning and individualised, practice-oriented, and open formats of assessment are preferred (Stenström et al., 2006) ⁽¹⁶⁾.

In contrast, the cognitive view would rather rely on knowledge being produced by scientific disciplines that can be applied in practice. Such a conception of knowledge is often associated with the belief that teacher-centred learning would be most efficient. Teaching is seen as an offer of structured information to be processed by students (knowledge transmission through instruction). The learning result is also explicit knowledge (rules, theories), which can be assessed by paper and pencil, i.e. standardised and closed formats which are separated from the preceding learning process (see more on assessment in Section 3.2). There are exceptions to these simplifications and, in practice, there are many more mixed and grey forms. For instance, teachers fostering student-centred learning may not consider themselves to be coaches but keep their identity as teachers. Teachers considering themselves to be coaches may still use standardised assessment for certain purposes. Selection of the appropriate format of instruction also depends on the target group and the preferences and cognitive prerequisites of individual learners.

Nevertheless, such explanations allow us to specify what we consider to be changes in the epistemological basis of VET. First, it enables us to refer to changes in the way knowledge (including skills and competences) is differentiated in

specific/vocational subjects in classrooms (theoretical vocational skills/knowledge); practical learning in workshops at schools (practical vocational skills learned in school); and practical learning at workplaces (practical vocational skills learned at the workplace).

⁽¹⁶⁾ Debate took place within the project team on whether we should separate the pedagogical from the epistemological perspective, as there are differences, and to present four perspectives instead. We decided to keep them together as they are often closely related but acknowledge that in certain applications of the framework it could make sense to split them. This also concerns the relationship between curriculum, pedagogy and assessment which could be more articulated in future versions of the framework.

curricula to make it organisable for instructional purposes. In this sense, for instance, the introduction of the learning fields (*Lernfelder*) approach in Germany (Chapter 4) can be regarded as a change in the epistemological basis of the German dual system. Second, the theoretical concepts or views upon which the differentiations of knowledge in curricula are based can also change. For instance, curricula may be organised by differentiating between practical and theoretical knowledge (and accordingly between lecturing and practice periods). However, even without changing the structure of curricula, the way this structure is understood may change: a shift from a cognitive to a tacit knowing view would imply that practice is no longer seen as the application of theoretical knowledge.

The type of learning setting and whether learning takes place mainly on the job (work-based learning in real work contexts) or in classrooms or in workshops in schools, is potentially a good indicator of the type of knowledge acquired. For instance, certain business process knowledge is best acquired on the job, while mathematical reasoning can be well trained in classroom or group settings.

However, a correspondence between learning environment and the type of knowledge acquired should not be taken for granted. Practising freehand drawing in a workshop or at home may make little difference; having a foreign language class with a small group of employees at work or a similar group of students in a classroom may yield the same learning outcomes. But being forced to work with a superior in a foreign language will result in different language skills, just as it makes a difference for freehand drawing skills whether they are acquired through courtroom sketches or architectural drawing. Advances in technology-based learning and simulation technology have made the situation more intricate. For instance, using train or flight simulators (digital/simulated learning environments) to become train drivers or pilots has become standard practice and is considered more effective and efficient than training in physical/real learning environments in this context. An important pedagogical distinction could be made here between real life conditions, where mistakes can have drastic consequences, and more controlled physical environments.

If we consider the various forms of learning environment (real/simulated) and learning sites (on the job, class or workshops) alongside the question of VET didactics and curriculum design, the question of how they are integrated takes centre-stage. Broadly speaking, we can distinguish between strongly integrated or well-adjusted learning sites and those which are weakly integrated or not at all coordinated. This issue is also much debated in research under the concepts of boundary crossing (Akkerman and Bakker, 2011 and 2012; Billett, 2014; Billett and Henderson, 2011) and recontextualisation of knowledge (Griffiths and Guile, 2003; Guile and Evans, 2010).

Another question that is instructive for the type of integration of learning sites (if there are different learning sites at all) is what building blocks or reference points are used to develop VET curricula? Are these traditional school subjects which themselves often build on or use reference disciplines or are these work tasks or even business processes? It is easier to achieve stronger integration between learning at school and learning at work through a curriculum based on work tasks or business processes than by a curriculum structured by disciplines: working life is usually not structured that way, not even for academics working in specific disciplines. In contrast, subjects, their underlying disciplines and theories, remain a particular resource in solving (local) problems.

Table 4. **Dimensions and categories of the epistemological and pedagogical perspective**

Pedagogical aims and objectives			
33. Pedagogical / personal aims	Individual progression, work readiness and smooth education work transition	Becoming a responsible and politically engaged citizen	Personal and physical growth, self-fulfilment and identity
34. Breadth or specificity of programmes / qualifications	Job-specific training/ qualification (e.g. machine operator)	Occupation/profession-specific (e.g. brickmaker, nurse)	Related to broader vocational field (e.g. construction, health) Vocational preparation (various vocational fields, polytechnic)
35. Ethics / ethical attitude	Commitment/performance orientation	Citizenship values/democracy	Professional values/work ethics
Knowledge approach and acquisition			
36. Knowledge approach and focus	Practical knowledge/experience-based		Theoretical knowledge/ subject- or disciplinary-based
37. Approach to knowledge acquisition	Knowledge acquisition through socialisation		Knowledge transmission through instruction
38. Character and use of knowledge	Specialised, specific/targeted knowledge for work contexts		Non-specialised, common and general knowledge for social participation
Teaching approaches and role of teachers			
39. Pedagogical/ didactical approach	Learning by doing, problem and project based, 'contextual' learning		Instruction-centred learning
40. Control over learning	Self-directed; student-centred		Instruction-centred; teacher-centred

41. Teacher-learner relationship	Master-apprenticeship	Teacher-student	Different types of instructors (teachers/workshop trainers)
42. Teacher role	Facilitator, coach, moderator, adviser	Lecturer, teacher (knowledge carrier)	
Assessment approaches (see Chapter 3 for more details)			
43. Assessment	Individualised, flexible, open formats	Standardised, closed formats	
Role of general and civic content			
44. Relationship between general and vocational subjects	General subjects integrated	General subjects separated	
45. Role of civic and general content	Civic and general content such as civic education, ethics/religion or sports form an obligatory part of the IVET curriculum	Civic and general content such as civic education, ethics/religion or sports form an optional or no part of the IVET curriculum	
Curriculum design			
46. Reference points for curriculum design	Subjects /disciplines	Canonical occupational knowledge/ domains	Work/job tasks/ business processes
47. Task/process orientation of curricula	Job/task-orientation	Business process orientation	
Learning formats and contexts			
48. Learning sites	Mainly on the job/work-based learning in real work contexts	Multiple learning sites (e.g. some form of duality)	Mainly in classrooms with some practical experiences or workshops
49. Learning environment (digital/real)	Digital/simulated learning environments	Physical/real learning environments	
50. Integration of different learning sites	Strongly integrated / adjusted	Weakly integrated / separated	

Source: Cedefop.

CHAPTER 3.

Zooming in and zooming out

3.1. Introduction

This chapter illustrates how the analytical framework can be expanded for the purpose of analysing individual dimensions in more detail, using the assessment and the knowledge dimensions as examples. Our analytical framework refers to a certain level of abstraction and operationalisation, which has proven to be particularly suitable for the analysis of systemic levels, programmes, structures and concepts. By 'zooming in' closer to the object, we can get a detailed picture of the respective object, the respective dimension. Zooming back out again shows the broader context of certain phenomena while still having the details in mind. There are essentially two modes of zooming in.

In Mode 1 we further break down the dimension in which we are interested into sub-dimensions, while largely remaining in the same perspective. For instance, in the case of assessment, a typical research question following this mode would be 'To what extent are assessment methods aligned to and supporting specific teaching methods?'. Hence, the alignment of assessment methods with teaching methods would be a typical sub-dimension in the epistemological and pedagogical perspective.

In Mode 2, we look at the dimension in question (in this case assessment in VET) as an object of research in relation to its context and hence through all three perspectives of the framework. A typical research question of this type would be 'How has the relevance of assessment within the education system and for the labour market changed?'. Typically, this second mode gains significance when looking at VET or issues of VET in a comparative international setting, since the prevailing concepts and practices in a national VET system often transcend the boundaries of one perspective or another.

In the following we discuss these two modes of zooming in by using the assessment and the knowledge dimensions as examples.

3.2. Zooming in and zooming out on assessment

Assessment⁽¹⁷⁾ has been suggested as one of the many dimensions of the epistemological and pedagogical perspective, roughly distinguishing between 'individualised, flexible, open formats' on the one hand and 'standardised, closed formats' on the other hand (see Section 2.3). But what do we mean by that? To explain this distinction, we need to refer to some other basic distinctions.

When focusing on the individual, two main purposes of assessment can be distinguished: assessment for learning (formative assessment) and assessment of learning (summative assessment, e.g. as a basis for a qualification or certification at the end of a learning process (Cedefop, 2022c, p. 28)).

Assessment for learning (sometimes also referred to as learning-supportive assessment) is used to provide feedback during the learning process, to support learners' learning and improve their performance. Formative assessment also supports learners to have an active role and take control of their own learning process. One type of formative assessment can be diagnostic assessment at the beginning of a learning process; this is understood as an attempt to identify students' strengths and weaknesses, their current knowledge and potential misconceptions about a topic (Riley, 2017). It can be conducted before the start of a learning unit and allows the teachers or trainers to adjust their intervention to build on the learners' strengths and to meet their needs (OECD, 2013, p. 140). Diagnostic assessment in this understanding allows a teacher to determine students' individual strengths, weaknesses, knowledge and skills prior to instruction. It is primarily used to guide lesson and curriculum planning, and can inform the individualisation of instruction.

Assessment of learning is usually used to present a summary of student learning against a predefined standard. The results are usually significant for the person as the basis of grading, ranking, selection decisions and, in turn, have consequences for the student's future, such as progression to the next higher grade, entrance into the labour market, or into higher education. This type of assessment can also have a prognostic function. For example, it can be assumed that the assessment for the acquisition of a qualification that allows access to higher education studies determines those competences that are associated with successful study progression. The results of summative assessment in IVET are usually documented in a certificate or qualification.

(17) For the purpose of this paper, we use the following general definition of assessment: 'Assessment is understood as the process of establishing the extent to which a learner has attained particular knowledge, skills and competences against criteria such as learning outcomes or standards of competence' (Cedefop, 2015, p. 21).

Another important distinction that can be made relates to the question ‘What is assessed?’ and thus to different types of knowledge and skills (see below). Are certain skills, for instance general skills (such as numeracy), assessed separately from vocational skills (such as accounting skills) or are they assessed together in an integrated way?

Learning takes place in formal, non-formal and informal learning contexts. To what extent assessment is considering the different learning settings or is conducted independently of those is another relevant question for the approach to assessment.

Linked to the context is the question of internal assessment (conducted at the provider, by teachers and trainers) versus external assessment (conducted outside the provider, e.g. by national assessment centres) and the question of authenticity of assessment (e.g. in the work context or as an extraordinary assessment situation) which can be seen as a continuum between a high and low degree of authenticity (Cedefop, 2022a).

When looking at assessment in VET from some distance, two poles of a spectrum can be roughly distinguished (compare Table 4). There are standardised forms of assessment that are the same for all learners in terms of method, context, and assessment criteria. They are usually closely linked to summative procedures and particularly to final examinations leading to the award of qualifications. The methods applied typically include multiple-choice or other closed test formats. At the other end of the spectrum are individual and flexible forms of assessment. These allow the assessment to be adapted to the individual circumstances and needs of the learner and are used especially for formative, but sometimes also for summative, purposes. This approach also allows for the use of more open assessment formats, such as portfolios, to demonstrate student progress (Cedefop, 2022c).

This way, additional categories or features of assessment as proposed above and discussed in more detail in Cedefop (2022c) can be used to define what we mean by individualised and open formats, on the one hand, and standardised and closed formats on the other. We can zoom in and analyse assessment practices in more detail and provide additional arguments for the positioning of a VET system or programme/qualifications along the basic continuum suggested.

Table 5. **Zooming in: profiles of the two broad distinctions of assessment**

Dimensions	Individualised, flexible, open formats	Standardised, closed formats
Purpose of assessment	Assessment for learning (formative assessment)	Assessment of learning (summative assessment)
Integration / separation of different types of content	Integrated, holistic assessment	Different types of knowledge and skills are assessed separately
Learning contexts	Assessment explicitly includes specification of the context of learning	Assessment is explicitly independent of the learning context
Sources/methods for collecting evidence related to practical knowledge	Indirect and supplementary evidence are also used	Only direct evidence is used
Internal/external	Internal assessment is also included	Focus is on external assessment
Location	Other locations are also included (laboratory, workshop etc. at VET institution, workplace)	Mainly classroom at VET institution
Authenticity	High degree	Low degree
Standardisation	Low degree	High degree
Assessors	Various types of internal and external assessors	Focus is on external agencies
Learner involvement	Candidates and peers are also involved	No involvement of learners

Source: Cedefop.

The point here is not to argue that there are simply two approaches, either a detailed analysis or a more generalised analysis by ‘rule of thumb’. On the contrary, the task of policy-relevant comparative social research is precisely to clarify this effect of zooming in/out and to establish connections that would be lost in one or the other perspective. Regardless of whether we are looking at institutional structures or practices, even detailed analyses must not lose sight of the big picture; conversely, we must suggest ways in which we could systematically go into more detail if needed. In theorising practice, Nicolini (2009; 2012) describes this as a double movement of zooming in on, and zooming out of, practice, obtained by switching theoretical lenses and tracking up the connections between practices.

There are more dimensions relevant to exploring assessment than those referred to above: the basis of assessment (e.g. norm- or criterion-referenced, the method (e.g. written or oral) and the environment (e.g. face-to-face or online), are some. However, these dimensions do not directly support the ‘poles’ suggested above; rather they add additional dimensions to study assessment practices (see Cedefop, 2022c for a discussion for further dimensions).

In this example of assessments we have remained in only one of our three perspectives, epistemological and pedagogical. In our empirical analysis of changes in assessment practices (Cedefop, 2022c) the specific research questions required us to focus on the pedagogical perspective at the expense of the two other perspectives.

However, it is particularly interesting – especially in an international comparative context – to place the characteristics of a specific practice in their wider context. The question would then be: what is the relationship between a particular assessment practice and its social and economic functions within a VET system? Here, the other two perspectives, educational system and socioeconomic, must also be considered. This is where Mode 2 of zooming in comes in. A consistent and comprehensive application of the framework also requires us to define key dimensions from the other two perspectives.

For the socioeconomic perspective, this could include an exploration of the signalling function of assessment results, and hence the question of the extent to which employers consider individual student grades or performance indicators of a graduates' VET institution in their recruitment practice. The question of how far summative assessment, in terms of certificates and licenses, is a precondition to practice in certain regulated occupations or professions, such as electricians, nurses or medical doctors, could also be of value. Such an analysis beyond the limitation of one perspective could look at the functions, intended effects and unintended effects of different assessment methods. Potential goal conflicts can be unveiled. For example, the validity of an assessment might be a concern that is of importance to an employer, while for an education manager – given the entitlement functions of an exam – reliability and objectivity might be more of a concern.

To complement the metaphor, it is not just about using a telephoto lens by which we can zoom. We also need to keep the idea of looking at the object from different angles and combine these angles to see things differently, just as stereoscopy enables us to see an object in a new, three-dimensional way.

3.3. The knowledge dimension: achievements and prospects

Knowledge, skills and competences ⁽¹⁸⁾ are at the heart of the vocational curriculum and any VET system. A VET system aims at the (re-)production and the delivery of content, but it is also a means of building the basis to produce new knowledge.

In order to develop an applicable and theoretically sound approach for an appropriate classification of knowledge in curricula, we evaluated various theoretical approaches from the fields of industrial psychology and professional learning, conceptual-analytical analysis and curriculum theory. Wittig (2022) has proposed to distinguish an intrinsic view of knowledge from an extrinsic view on vocational knowledge, based on recent literature on vocational knowledge and the critical reception of human capital theory and its concepts of general versus specific human capital. General human capital refers to knowledge and skills that are generally valid on the labour market, whereas specific human capital is bound to single organisations. Human capital theory looks at the portability of knowledge on the labour market (Table 2, dimension 25). Wittig points out that, instead of looking at the principles of the organisation and structure of the knowledge (in) itself, the extrinsic view looks at the use of this knowledge for certain individual practical or societal applications. Intuitively, knowledge seen as a dimension of our analytical framework belongs to the epistemological and pedagogical perspective. However, the example shows that a classification according to external conditions is also necessary, which can be represented here by one dimension of the socioeconomic perspective.

This purpose-oriented and context-bound nature of professional knowledge also poses special challenges for comparative analysis. In the following sections we show how the three perspectives model can help to structure an approach to dealing with these challenges. First, we present a pragmatic approach of classifying vocational knowledge based on the experiences within this project. We then show how Mode 2 zooming in can be applied to the knowledge dimension and point out what further steps might be needed in order to arrive at an improved classification.

In the framework we broadly distinguish between practical and experience-based knowledge, on the one hand, and theoretical and subject- or disciplinary-

⁽¹⁸⁾ In the following we use knowledge as an overarching concept including skills, competences, abilities and other forms knowledge and specify these accordingly using further adjectival attributes such as tacit, procedural, declarative, etc.

based knowledge on the other, which perpetuates a millennia-old problem of theory and practice, mind and body or know-how and know-that (see Section 2.5).

Regarded as extreme poles on a continuum, this crude dichotomy has proven a helpful indicator in describing broad differences between VET systems and programmes. During the project we have wrestled with various finer distinctions without ultimately arriving at a classification of knowledge that is satisfactory for our purposes at the moment.

One potential avenue to explore might be not to start with the question of practical or theoretical knowledge, but instead to first consider ‘specialisation’: the extent to which knowledge is specialised and how it is systematised in contrast to non-specialised or generic knowledge. Knowledge can be systematised or structured according to ‘pure’ disciplines, more applied disciplines, professional domains or ‘occupational canons’ or can follow a more limited, eventually single organisational context. See also Table 6, in which we have used some of the terms, concepts and categories that we have come across during our quest for appropriate conceptual tools.

Table 6. **Zooming in and zooming out on the knowledge dimension**

Knowledge approach	Practical knowledge / experience-based	Theoretical knowledge / subject- or disciplinary-based
Specialised knowledge structured by contextual purposes	Job- or organisation-specific (situated) know-how and know-that acquired through workplace experiences such as knowing whom to ask or when to request guidance or knowing how to deal with particular clients; often tacit, situated knowledge and acquaintance knowledge.	Situated know-that: the list of a firms’ clients’ name one has in mind, knowing where files are stored, names or model numbers of a particular product lines of cars or vacuum cleaners. Explicit knowledge, some of which risks becoming useless when jobs are changed.
Specialised knowledge structured according to ‘applied’ disciplines, domains or canonical occupational knowledge	The ability to use tools and techniques specific to professional domains such as CAD systems, project-management for construction, but also the capacity to explain why a course of action has been taken; know-how that is transferable between workplaces within a professional domain or set of similar jobs.	The knowledge to be found in technical literature, manuals, regulations, such as the properties of building materials, CEN norms, road and traffic laws, rules of management.
Specialised knowledge structured according to disciplines or subjects	Scientific literacy and reasoning such as the ability to apply scientific methods and techniques, e.g. assessing sources, citing correctly, understanding and applying the law of excluded middle, conducting regression analysis.	The knowledge we remember from science books, e.g. knowledge of physical or chemical laws, but also grammar rules, historical facts and the knowledge to be found in scientific journals.

Knowledge approach	Practical knowledge / experience-based	Theoretical knowledge / subject- or disciplinary-based
Non-specialised, largely context-independent, 'transversal' knowledge	Key competences, e.g. literacy, numeracy or general social competences	(Explicit) everyday knowledge, the sort of propositional canonical knowledge one should have after compulsory education

Source: Cedefop based on Wittig (2022).

Occupations and jobs, as well as vocational programmes, clearly differ to the extent that these forms of knowledge are relevant to them; their relevance also changes over time. Some occupations may require very specific scientific knowledge of a single discipline, while others require only some basic understanding, but perhaps of a range of disciplines; others may not require any specialised, disciplinary knowledge, but the canonical knowledge of a certain occupation including long-term and deliberate practice.

Instead of, for instance, claiming that apprenticeship training is more 'practical' than school-based programmes, we could claim that apprentices acquire extensive specialised practical and theoretical knowledge structured by contextual purposes (i.e. an occupational practice). VET colleges or universities of applied science focus their teaching on practical and theoretical specialised knowledge structured according to 'applied' disciplines.

We could further claim that the knowledge required to perform successfully at work contains both situated knowledge (in our terms specialised knowledge structured by contextual purposes) and 'canonical occupational knowledge' (Billett, 2017; Billett et al., 2018; Harteis, 2018) that might contain different knowledge components as described above⁽¹⁹⁾. It is socio-cultural accounts of vocational education in particular that emphasise the close connection between the knowledge and the practice itself, as does the 'tacit knowing' view addressed in Section 2.5. Different theoretical accounts of knowledge, which we considered relevant for our purpose, also suggest different categorisations. What they all have in common, however, is that, due to the significance of practice for learning, a simple theory-practice-divide is not useful⁽²⁰⁾.

Billet et al. propose 'occupational practice' as the major reference system for vocational education. Situated knowledge (see examples in Table 6) would be the knowledge that is required at certain workplaces or in specific organisations. Canonical occupational knowledge would be the knowledge that is generally

⁽¹⁹⁾ See Billett et al. (2018) or, specifically on assessment, Stasz (2001) and Billett (2017).

⁽²⁰⁾ Both the sociocultural approach to vocational knowledge and also more cognitivist approaches to vocational expertise see this close connection of development and use of expert knowledge to a certain field of application, 'Domains' in their language. See also Dietzen (2017) and Dietzen (2020).

accepted as the knowledge required to practice a certain occupation. According to this approach the two – situated and canonical occupational knowledge – can become ‘vocational knowledge’ by processes of learning, internalisation and identification on the individual level.

The process of developing vocational knowledge is a phenomenon that is clearly located in the focus of the pedagogical-epistemological perspective. However, situated knowledge is more associated with the socioeconomic perspective and the term canonical occupational knowledge can be referred to in all three perspectives.

This is where zooming in using Mode 2 comes into play. In Mode 2 we need to look at the relationship between concepts of vocational curricula, models of work organisation and the potential for learning and identification. For instance, it makes a difference if a certain skill or practical knowledge is acquired in a work setting that is characterised by an instrumental use of technology or in contrast by a participative and developmental approach. The same applies to the question of whether learning takes place in an environment with a strong division of labour (taylorist) or more holistic professional settings (discretionary learning or lean production). Both examples refer to dimensions of the socioeconomic perspective (Table 3, dimension 24).

An important point to stress is that the same occupation might differ across countries in how it is organised, how and by whom the canonical knowledge is set up and selected, and how this is integrated into the education system. This, in turn, can have significant consequences for the potential of an occupational practice to serve as an environment for developing personal vocational knowledge. Developing personal vocational knowledge ultimately is a process of implicit and explicit individual decision-making, selection and sense-making.

The term canonical nicely illustrates that determining which knowledge is important for a profession or an occupation relies on processes of selection. Such processes differ by country but also depend on different conceptual approaches.

Our literature reviews (Cedefop, 2022a) suggest that even the various approaches we have found, in theory correspond to our three perspectives to varying degrees. The socio-cultural approach and the psychologically driven approaches correspond to our pedagogical-epistemological perspective.

Bernsteinian approaches and so-called critical realist positions (e.g. Wheelahan, 2010; Young, 2008a) strongly emphasise the structuring and distribution of knowledge within society and separate experience and knowledge. Knowledge – as acquired through participation in the education system – is seen as the major resource for participating and developing in society. Approaches based on work process knowledge (WPK, e.g. Boreham, 2002; Fischer, 2000;

Kruse, 1987) are based on a debate that looks at knowledge and experiences as an outcome of participation and a resource of power in production processes. Hence, WPK is a dominant resource of development and progression in economy and society. The critical realist approach is more closely related to the education-system perspective, whereas the latter relates clearly to the socioeconomic perspective. In any case, these affiliations and relationships are not exclusive but indicate the dominant perspective.

As the different theoretical approaches differ in their emphasis, this is true also for institutional and collective selection processes. Despite some convergences across Europe (Cedefop, 2022a) there is a great variety of structures and forms of vocational curricula, which ultimately represents different curricular aims and conceptions of vocational knowledge.

How can Mode 1 and Mode 2 zooming-in help when analysing VET? Mode 1 is primarily a way of extending the existing analytical framework. For the analysis of specific aspects or sub-practices of VET systems, the analyses can be broken down further and more details can be revealed. This can be done, for example, based on the analysis of the state of research. In some cases, it will be possible to 'underpin' the existing dimensions and categories with new sub-dimensions, in other cases it might become necessary to expand the existing framework by adding a new, so far missing, dimension to one of the three perspectives. Mode 1 mainly supports the descriptive purposes of the framework.

Mode 2 makes use of the multi-perspectivity of the analytical framework. It contributes to the overall understanding of (other) systems and concepts and can also be the basis for hypotheses and explanations.

As to the knowledge dimension, aims, purposes and effects of curriculum content can only be adequately understood when backed up with information about the socioeconomic and educational context. Mode 2 provides a basis of triangulating concepts of knowledge with other dimensions of the framework in order to interpret concepts properly. Another application is forming hypotheses. For instance, the socioeconomic perspective focuses on skills utilisation, particularly the portability of skills. Hypotheses on the latter can be formed with the above categorisation. Non-specialised, transversal knowledge might also be portable across domains, while domain-specific skills and canonical occupational knowledge (specialised knowledge structured according to applied disciplines or domains in Table 6) are portable between workplaces within the same occupational domain. Situational, local, contextual knowledge of organisations and organisational procedures has only limited portability.

A substantive categorisation of vocational knowledge that includes the 'how' of systematisation of vocational or occupational knowledge can only be carried out

by looking at the issue from all three perspectives. Greater efforts than were possible in this project will be required to justify a classification of the contents of vocational curricula that does justice to the diversity of selection principles across countries and occupational practices, while at the same time empirically based on existing (intended) curricula. Such work would presuppose intensive examination of the design principles, the actual curricula and the occupational practice itself; this already makes great demands at the linguistic level, let alone in terms of the appropriate selection and sampling of documents. Hence, future work in this direction should involve questions like the following.

- (a) What are the selection principles at collective or institutional level? Currently the different selection principles at institutional level are described by the different categories used in the rows of six (applied disciplines, domains or canonical occupational knowledge, disciplines or subjects). However, these categories are not yet based on an exhaustive analysis of vocational curricula. A typology of selection principles and models of canonical occupational knowledge might be helpful in this regard.
- (b) Regarding individual learning processes, classification would require a better categorisation of individual vocational agency. What is the role of the individual in constructing vocational knowledge? Is it mainly understood as an adaptive-receptive process or are there possibilities for individual reflections and personal selections? Is knowing-why part of the learning or not? What are the possibilities of expansive learning?

CHAPTER 4.

Examples of applying the framework

In this chapter we present four examples of how the approach explained in the previous chapters has been used in Cedefop projects over the past 5 years. We first show how different national VET conceptions could be analysed systematically and country patterns identified. We then show what trends are emerging in the assessment of VET in Europe and how the framework has been used to define and investigate academic and vocational drift in vocational education at higher levels. Finally, we explain what role the framework has played in the development of VET scenarios for Europe (Cedefop, 2020b). Further examples of its application concern a comparative analysis for VET curricula in Europe with a focus on the relationships between general, vocational and transversal skills, as well as work-based learning (Cedefop, 2022a) and the extent to which IVET institutions in Europe have been opening up to adult learners over the last two decades (Cedefop, 2023, forthcoming).

4.1. National conceptions of VET

The first application, and ultimately the starting point for the development of the approach, took place right at the beginning of the Cedefop project *The changing nature and role of vocational education and training (VET) in Europe* (2016-18). The challenge was to master the diversity of national VET approaches in Europe and to provide a basis and orientation for the further work strands of the project; this should not force the countries into predefined pigeonholes and, above all, take into account the long-term changes in national VET systems. As such, we were interested in how VET is legally defined and generally understood at national level and how this understanding may have changed over time.

For this purpose, we translated the initial version of the framework (consisting of 17 dimensions instead of the current 40) into a questionnaire and carried out a survey among national VET experts in autumn 2016. The experts we selected for this task were required to have in-depth knowledge about their country's VET system and have experience of working comparatively. They came from universities, public and private research organisations and national agencies dealing with VET. They were provided with the list of categories of the framework as well as a background paper with definitions and had to choose which categories suited their country's VET system best. Filling in the questionnaire took the experts

1 to 2 full working days because, apart from ticking the right box, they had to provide evidence for their judgments and were also asked to consult peers to review their assessments. In several cases we conducted additional interviews with the experts to understand better the answers provided in the survey, and conducted further national research where necessary. In this way, 30 national profiles were created, in a few cases with two profiles for different VET sub-systems. The analysis was carried out by topic and countries, qualitatively and quantitatively ⁽²¹⁾.

The outcomes of the survey demonstrate the significant diversity of European VET systems, essentially showing that all national VET systems have their particular characteristics and that we can speak of 30 (or more) genuinely national approaches to VET (Cedefop, 2017b). This variety is also reflected in the national terms used for VET, with their particular shadings of VET systems.

Despite the variety, VET is seen to have certain features: largely perceived by the experts consulted as occupation-specific education and training geared towards securing a supply of skilled labour; generally seen by the public as inferior to general or academic education; predominantly addressing young people; providing qualifications at the middle level of education (ISCED-11 levels 3 and 4); and being financed by education budgets and coordinated by central governments,

There are interesting exceptions to this 'general rule' of VET in Europe, though. For instance, VET in Finland was considered equal to general education. With the introduction of a new law in 1998, the vocational track was given equal status with general education to access polytechnics and universities, making VET equal to general upper secondary education as a pathway to higher education ⁽²⁰⁾. School-based VET in Austria, which was described as a separate but equally important conception as dual VET, is also perceived as equal to, or even higher than, general education. Although there are different types of vocational school in Austria, school-based VET is strongly associated with the so-called higher technical and vocational colleges (short form: VET colleges) ⁽²²⁾. These are rated higher than academic education because, in addition to the school-leaving certificate providing access to higher education, graduates obtain a VET diploma, which is well recognised by industry. Also, VET college programmes last 1 year

⁽²¹⁾ A hierarchical cluster-analysis for binary data was conducted both with linkage between groups and linkage within groups for exploratory purposes. For details see Cedefop, 2017b.

⁽²²⁾ See [Austrian education system: college for higher vocational education](#)

more than their academic counterpart and are perceived as more demanding than the academic track due to their higher workload ⁽²³⁾.

Reflecting this combination of diversity and convergence, four dominant conceptions of how VET is understood became visible (compare Cedefop, 2017b, p. 25ff):

1) VET understood as work-based/dual initial training

This conception has been identified in Denmark, Germany, Hungary and, for the apprenticeship track, in Austria. VET is considered to be based on practical knowledge and learning by doing for young people (recognised as apprentices) to become members of an occupation/profession (initiation) with distinct occupational or professional ethos and occupational rights. Substantial contributions by companies (financially and as a place of learning) and strong coordination between employers (and trade unions) are presupposed in this conception of VET. It is clearly associated with middle-level education (ISCED-11 levels 3-4) with or without restricted access rights to higher education. An employer perspective is dominant in so far as VET's main purpose is to secure the supply of skilled labour and to foster business innovation and growth.

2) VET understood as initial vocational education

In this case, VET is understood as a part of initial education, where schools financed and governed by the State are the main place of learning and learners are regarded as students. Despite the large variations within this type, two sub-patterns have been distinguished. On the one hand there is vocationally oriented school education (2a) which is discipline-based, mainly takes place in classrooms (although they may be work-based), and teacher-student relationships, instead of master-apprentice, are the normal case. VET is not necessarily occupation-specific, but can also aim at broader vocational fields, is targeted at middle and higher levels (ISCED-11 levels 3-5), addresses young people (15-19), and provides access to higher education. Individual or societal perspectives are more evident, for instance individual progression and personal growth is rated more important than securing a supply of skilled labour. This conception was identified in Belgium-Flanders, Bulgaria, Spain, Malta, Romania and Slovenia, and to some degree in Czechia, and the Baltic states. There is also a broad range of more occupation-specific upper and post-secondary education (2b), which also addresses young adults (18-24) and for which securing the supply of skilled labour

⁽²³⁾ This is also acknowledged in education statistics: as academic are classified as ISCED level 3, while the past 2 years of Austrian VET colleges were already classified as level 4 in ISCED-97 and are now classified as level 5 in ISCED-11.

and entry into working life is rated more highly. It is more diverse than type 2a in many other aspects: levels of education span from low to high, and so do skill levels (semi-skilled workers and skilled workers); types of providers, instructions and learning approaches can be diverse; and school-based and work-based options may form part of one system. This understanding prevails in Croatia, Luxembourg, Netherlands, Poland and Portugal, and to some degree in Greece

3) VET understood as further training

Here, VET is understood as mainly on-the-job further training offered by a wider range of further and higher education providers for all age groups (but with high shares of older learners) at various levels (including lower levels, such as ISCED-11 level 2) to enable people to become semi-skilled, skilled workers or professionals (with no specific occupational rights). Programmes for the unemployed or second-chance programmes form part of this understanding. Entry into working life or employability is seen as more important than occupational identity. Employers' views dominate and VET is regarded as a means to secure a supply of skilled labour and promote innovation and economic growth. This pattern was identified for Ireland, Cyprus and UK-England.

4) VET understood as (part of) lifelong learning

Here, VET is understood as the (organised) coexistence of a diverse set of learning approaches (disciplinary- or experienced-based), learning sites, education and skill levels (semi-skilled, skilled and professional), age groups, status of learners (apprentices or students), types of providers (school, companies, higher education), types of instructors (teachers, trainers, masters), learning outcomes and types of qualifications (occupational, educational). Consequently, VET is associated with various purposes including equity and inclusion, and IVET and CVET form part of one conception of VET in the form of lifelong learning. This conception was identified clearly for France and Finland, but to some degree also was also found in Ireland, Greece, Croatia, Italy and Luxembourg.

These patterns of national VET conceptions have been found to be quite stable. Many country experts reported major reforms during the period covered by the study (1995-2015), but, at the same time, underlined that they have not changed the overall conception of VET. Nevertheless, our approach revealed a remarkable diversification of VET in terms of providers, levels and target groups, increased horizontal and vertical permeability, renewed emphasis on work-based elements, coalescence of initial and continuing VET, and hybridisation of systems and programmes over this period. In terms of overall changes, two main trajectories of current VET conceptions stood out (compare Cedefop, 2017b, p. 34ff): strengthening of VET points in the direction of VET as work-based training

(illustrated by Denmark or Germany) and expanding to new parts of the education and training system, in particular higher education; and diversification of VET points in the direction of VET as (part of) lifelong learning (illustrated by France or Finland). These directions have later also been used to build scenarios for the future of VET (see Section 4.4). The example also shows that, for national VET experts, the framework can be used like a questionnaire, and that it is even possible to run a quantitative analysis based on the framework.

4.2. Trends in VET assessment

As illustrated in Chapter 3, the analytical framework was elaborated in detail in order to map and analyse the forms of assessment prevalent in IVET in Europe and how they have evolved during the last 25 years. We particularly aimed to explore the extent to which the objectives set by qualifications, programmes and curricula in terms of content and profile were supported by assessment, and the extent to which assessment was influenced by changes in this area. Further central questions guided our research. To what extent are assessment specifications and standards used to support summative assessments? To what extent are assessment specifications aligned with qualifications and programme standards? To what extent could a broadening of the skills and competence base of IVET influence assessments?

Several research methods and datasets were used to answer these questions, including desk research, comprehensive data provided by Cedefop's ReferNet network, and a European VET provider survey. The main source of information, however, was seven thematic case studies in seven countries that were conducted by national VET researchers based on desk research and interviews with relevant key stakeholders. The guidelines for the case studies made use of the analytical framework and the national VET researchers were provided with a background note explaining the dimension and categories of the framework for analysing assessment. Below we summarise some of the results of applying the framework in this study ⁽²⁴⁾.

The research showed that assessment is continuously being reformed in the countries covered by this study, indicating its importance for improving the quality and value of VET. The way assessment has evolved over the years is closely linked to changes in the way qualifications and curricula are described and structured. The shift towards learning outcomes and the greater focus on flexible

⁽²⁴⁾ A detailed breakdown of the main trends based on the framework categories can be found in Section 3.7 in Cedefop (2022c).

and individualised learning pathways has led to the introduction of new approaches to assessment. Closer links with the labour market and the involvement of employers in all aspects of VET can be seen as driving factors for the introduction of corresponding assessment methods.

Previous research has pointed to a stronger focus on formative assessment (Psifidou, 2014), a trend that is expected to continue in the future (European Commission, 2020b). The results from this study confirmed this trend. The strengthened focus on formative assessment can particularly be observed as policy intention linked to a learner-centred approach. Similarly, research has pointed to an increase in VET learner self-assessment, further emphasising formative assessment. However, in some countries a parallel trend to more summative assessment was identified, reflecting the aim to monitor the performance of VET institutions as part of quality assurance in VET. In aggregate, we found it difficult to discern the extent to which the emphasis on formative assessment approaches and learner-centred pedagogy are not just political intentions or lip service but have gained ground in practice. Summative assessment does not necessarily refer to an overall end-point assessment (at the end of a programme), but to the assessment of separate units or modules. We clearly observed increased modularisation during the past two decades and there is also evidence that several countries have introduced more flexible approaches, allowing learners to accumulate smaller parts of qualifications that are assessed separately. Some countries, however, seem to put a stronger focus on end-point assessments that cover the whole qualification.

A general increase in opportunities for validating and recognising non-formal and informal learning has also been observed in many countries in previous work. Thus, the increased tendency to organise assessment in a progressive and more flexible way (observed already by Psifidou, 2014) can also be confirmed by the current study, albeit to varying degrees in individual countries.

Similarly, in relation to the use of more standardised assessment approaches or more individual and flexible forms of assessment during recent years, a mixed picture emerges. In some countries both trends seemed to be present at the same time. The picture is mixed as to whether the same assessment methods are used for all learners or whether assessment can be adapted to learners' individual circumstances and needs. In some countries both trends seemed to be present at the same time. While written examinations remain common in all countries, there is evidence that countries have increasingly adopted new methods of collecting evidence of practical knowledge. For example, many countries have introduced final practical exams or assignments, projects and performance demonstrations. Skills demonstrations are also increasingly carried out in real work environments

and employers or other labour market stakeholders are increasingly involved in the assessment of VET learners. At the same time, the trend towards the use of digital assessment can be confirmed, having intensified during the COVID-19 pandemic.

The example of applying the framework to assessment in VET shows that is flexible and adaptable enough to specify single dimensions which are not positioned so prominently in the basic framework. However, as discussed in Chapter 3, questions can be raised whether a Mode 1 zooming in, always needs to be complemented with Mode 2 zooming in.

4.3. Vocational and academic drift at higher levels

The analytical framework was also adapted and applied to scrutinise vocationally oriented education and training at higher levels (EQF levels 5 to 8). One of our interests was the question of the extent to which (academic and professional) higher education (HE), as defined within the qualifications framework in the European higher education area (QF-EHEA), is subject to vocational and/or academic drift. The study also explored to what extent higher-level vocationally oriented education and training is delivered outside higher education (higher VET).

As a first step, a literature analysis was carried out to explore the main concepts used to describe vocational and academic drift and their underlying theories. The three perspectives and the initial framework were used to organise these concepts and further developed to fit the research questions. As a second step, nine case studies were carried out based on desk research and interviews with relevant national stakeholders for an in-depth review of the developments in selected countries ⁽²⁵⁾.

In order not to exceed the scope of the examples presented here, we cannot reproduce the entire framework, but content ourselves with some excerpts (Table 7). Below we summarise some results of this study ⁽²⁶⁾.

⁽²⁵⁾ Austria, Estonia, Germany, Finland, France, Italy, the Netherlands, Norway and UK-England. For more details see Cedefop, 2019b.

⁽²⁶⁾ The full list of indicators and more results can be found in Cedefop, 2019b.

Table 7. **Selected characteristics and indicators of academic drift, vocational drift and expansion of higher VET**

	Dimensions	Academic drift	Vocational drift (HE) / expansion of higher VET
Education system Perspective	Segment and level of the education	Vertical or upward extension of VET into HE as well as within HE (by adding higher-level degree programmes to offers)	Increased provision of vocationally oriented programmes /qualifications at higher levels; stronger emphasis on VET elements in programmes/ qualifications offered at higher levels (including traditional academic HE programmes)
	Other dimensions of this perspective include: Number/background of students; Outcomes/destination; Institutional landscape; Parity of esteem		
-Socioeconomic/ labour market perspective	Governance	Reduced labour market engagement in development and delivery of qualifications/ programmes at higher levels	Increased labour market engagement in development and delivery of qualifications/programmes at higher levels
	Other dimensions of this perspective include: Source of funding; Student identity/ legal status; Occupational hierarchy; Focus/purpose		
Epistemological or pedagogical perspective	Pedagogical/ didactical approach	Strengthening of theory-based reflection on practice and scientific research	Increased practice orientation of traditional higher education programmes, including applied research; strengthening work-related learning within institutions (on-site labs, workshops, etc.) and work-based learning in companies (e.g. industry projects, on-the-job training periods, apprenticeship-type schemes at higher levels)
	Other dimensions of this perspective include: Knowledge approach; Teacher-student relationship and background of teachers; Learning sites; Specificity of learning outcomes		

Source: Cedefop.

The study found that there has been expansion and diversification of vocationally oriented education and training offered at higher levels in European countries over the last two decades. Participation has increased and various forms of programmes and qualifications have been introduced. This has been particularly the case for professional higher education and is less evident for higher VET. By higher VET we refer here to vocationally oriented programme and qualification types that are fully outside the QF-EHEA and are linked to EQF levels 5 to 8 via their inclusion in a national qualifications framework (NQF), by professional higher education to vocationally oriented higher education that is part of the QF-EHEA (e.g. polytechnics, university of applied sciences, etc.).

From an education system perspective, we found that many European countries have introduced a separate strand of higher education during the past 20 years (or even earlier) or have established new vocationally or professionally

oriented higher-level degrees, leading to different models of higher education system in Europe. In most cases, a binary system has been adopted: universities and professionally oriented higher education institutions are regarded as separate, with different forms of governance. Countries have also opened up higher education to people with vocational qualifications or/and with work experience, but actual use of this non-traditional access route is still relatively low. Higher VET qualifications are generally based on initial VET qualifications and work experience, and there is no evidence that this has changed significantly over time. The upgrading of former VET programmes to higher education has strengthened the professional status of graduates. Depending on the type of qualification and programme, higher VET primarily prepares for access to the labour market or provides access to further learning and the labour market.

From a socioeconomic or labour market perspective, it is mainly vocational drift that has been observed and this has occurred in many ways. For instance, in many cases, vocational principles in the governance of professional higher education have been strengthened. At the same time, links with the labour market and employer involvement have been strengthened in governance but less so in financing. However, this trend is less visible in higher VET which has traditionally had a strong vocational orientation, with good links to the labour market and employer involvement.

From an epistemological or pedagogical perspective both academic and vocational drift processes have been identified. There is some convergence between different types of higher education programme, while higher VET programmes and qualifications mostly maintain their traditional focus on applied knowledge. Transversal learning outcomes are becoming increasingly important, indicating a shift towards broader profiles. The most visible vocational drift concerns the use of companies as learning sites. In the last two decades, on-the-job learning has increasingly been integrated into vocationally oriented education and training at higher levels, either in the form of internships as part of the programmes or as new formats of dual or apprenticeship training. This development can be observed both in traditional academic HE programmes and in professional HE; it is and less so for higher VET where learning in the workplace has traditionally been of great importance. However, there are also indications that academic principles or research competences have been more strongly emphasised in professional HE in some countries and increasing academic requirements for teachers have occasionally been emphasised.

Applying the analytical framework to a specific area of the education system has made it possible to look more closely at this area, which stretches across different education segments, and to identify similarities and differences in

developments. The example also shows that it is possible for the categories used for the analysis and comparison of VET systems (see Section 4.1) to be adapted to this specific area without losing the reference to the original framework. However, while in the former case it has been possible to identify four patterns of how VET is understood and to classify countries' VET systems (or sub-systems) accordingly, this was not possible in relation to vocationally oriented education and training at higher levels due to the lack of Europe-wide data and information in this area. Comparing the example of assessment with the example of VET at higher levels shows that the framework allows for analysing VET subsystems (e.g. higher VET) as well as specific aspects of VET (e.g. assessment).

4.4. European VET scenarios and the 'big picture'

Capturing the 'big picture' and getting a clearer idea of the changes in vocational education and training in Europe was the aim of the Cedefop project *The Changing role and nature of VET*. A retrospective analysis covered the period from 1995 to 2015, while an outlook analysis covered the years up to 2035.

For the retrospective component, changes in VET systems and their influencing factors were analysed using statistical analyses (e.g. the European labour force survey), country case studies by national VET experts (e.g. on the development of VET at higher levels, see above) and evaluations of national reporting systems (e.g. time series analyses of educational pathways). For the outlook, national and international scenario projects in the education sector from the last two decades were analysed in detail and an international scenario workshop was organised in which initial scenarios were worked out, taking into account the retrospective findings. A (non-representative) online survey was also conducted among VET experts. The analytical framework, as presented above, was used both for the retrospective analysis and for the scenario building.

In mapping the main developments in VET in Europe between 1995-2015, two dimensions stood out as significant and thereby also offered themselves as a basis for VET future scenarios: pluralistic versus distinct development and academic versus vocational drift (compare Figure 2). In a pluralistic scenario, VET systems are becoming more diversified, with fuzzier boundaries between them and general education. Conversely, where VET is seen as a distinct education and training strand, its profile is sharpened, and a return to its 'traditional roots', e.g. in terms of learning forms or curricula, is encouraged. Academic drift means that programmes and institutions are less work- and practice-oriented and that general subjects and disciplinary knowledge are prioritised by education policy as well as learners. Vocational drift means a stronger practice orientation, including large flows of

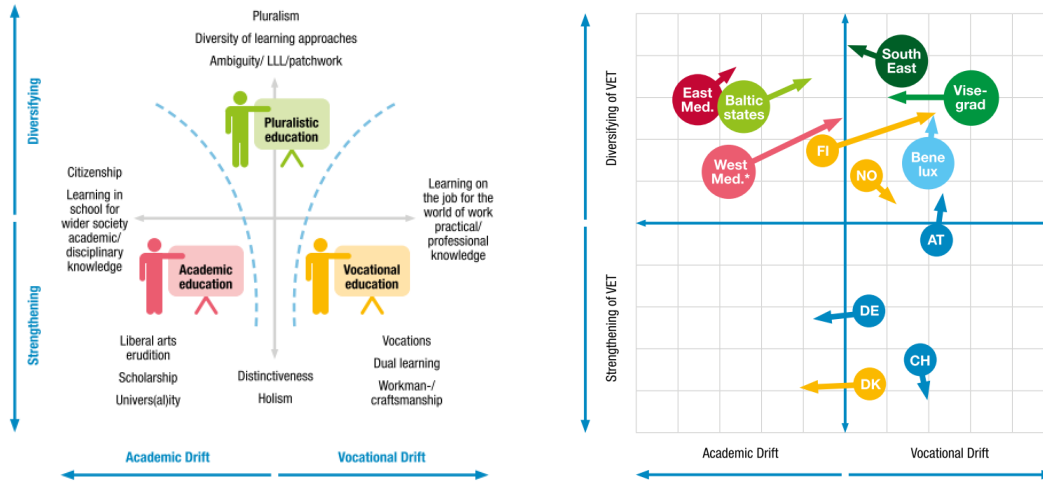
learners who choose vocational pathways. Combining these dimensions, three main scenarios for VET (and six detailed scenarios) were finally distinguished (for more details see Cedefop, 2020b):

- (a) pluralised VET with lifelong learning as a central feature, where the distinction between VET and general education becomes increasingly obsolete;
- (b) distinctive VET with vocational competence as the central reference point, a clear demarcation from general education and a certain supremacy of VET within the education system;
- (c) purpose-specific (or marginalised) VET, which in practice plays only a 'repair' or remedial function and a subordinate role in the education system and is reduced exclusively to job-specific qualification.

A 1-day workshop, in Vienna in July 2018, brought together 25 experts from VET research and policy from 14 different countries to develop the initial set of scenarios. The experts were divided into five sub-groups, designed to cover different professional perspectives, genders and nationalities. Each group was asked to develop scenarios within the framework of the above-mentioned model. Two groups developed scenarios of pluralised VET, two other groups developed scenarios of distinctive VET and another group a scenario of marginalised VET.

The participants first wrote their ideas and thoughts in the form of key words and short sentences on cards and explained them. Afterwards, the ideas were discussed, sorted and arranged on a pin board supported by a group facilitator. To structure the results, and to make sure that they were presented in a comparable way, the analytical framework was used and provided as a one-page handout. The workshop was divided into three phases. In the first round, the respective vision for 2035 was elaborated. In the second round, the reasons and developments that led to the respective vision were reflected upon and a story with a corresponding title was developed for each scenario. Finally, the different scenarios were presented to the other groups and discussed. After the workshop, a short evaluation took place with the facilitators, where they were asked to write a short report. They were given guidelines to write in narrative style, starting with the developments and critical events in the socioeconomic perspective, describing the situation accordingly, and concluding with the education system, and including developments and measures in the epistemological-pedagogical perspective. If possible, interactions between the three perspectives were supported with visual illustrations and all cards from the pin boards were included in the story. Afterwards, the facilitators sent the scenarios to the participants in their groups to revise and comment on them.

Figure 2. Scenario model to describe the changing role and nature of VET and the 'big picture', a schematic representation of change in VET in Europe, 1995-2015



Source: Cedefop 2020.

For the retrospective analysis, the framework was used to define a country's trajectory for the years 1995-2015 within a two-dimensional chart comprising strengthening/diversifying VET on one axis and academic/vocational drift on the other (see the right picture in Figure 2). The framework guided the search for different indicators for pluralistic versus distinct development and academic versus vocational drift.

For instance, from a pedagogical perspective, we considered an increase in work-based elements (e.g. internships) in school-based VET or higher education as vocational drift. Less classroom teaching, more hands-on learning, practice-based, case-based or project learning were also considered as indicators for vocational drift, as well as engaging more teachers with work experience from business and industries. From the education system perspective, the share of enrolment in vocational education at upper secondary level was considered to be perhaps the most reliable indicator to measure vocational or academic drift. From a labour market perspective, the strengthening of the role of social partners or giving more power to employers over content were considered to be part of vocational drift. Improving the responsiveness of education to the labour market (as in faster updating of curricula, fostering employability) or other measures that bring education closer to the world of work were also signs of vocational drift.

The vertical axis was more challenging to define but the framework was useful in identifying indicators. From a pedagogical perspective, signs of distinctive VET are a preference for learning in real-life work environments, the crossing of boundaries between practical and theoretical learning, and the vocation/

occupation (*Beruf*) as a key organising principle. A pluralistic view of VET acknowledges all this, but also accepts other approaches. In a pluralistic view of VET, disciplinary and professional knowledge are seen as equal and so are narrow forms of on-the-job learning and comprehensive professional education. Distinctive VET offers, and at the same time draws upon, identities based on occupational ethos, professionalism and workmanship. Pluralistic VET, in contrast, accepts other identities, such as those based on social or economic status or disciplinary background.

From an education system perspective, a VET sector that is clearly separated at all education levels from other education sectors is an obvious sign of distinctive VET. Expanding apprenticeships to lower and/or higher levels is also indicative of distinctive VET, but only to the degree that VET principles are retained. Other signs of pluralistic VET are an increasing diversification of VET providers, programmes or target groups. Introducing or increasing double or hybrid-qualifications that combine occupational and general qualifications would also be a sign of more pluralistic VET. From a labour market perspective, distinctive VET is mainly characterised as preparation for particular occupations/jobs whereas various new and additional purposes of VET, such as inclusion, equity and combatting youth unemployment, indicate a move towards more pluralistic form.

These are just a few examples of qualitative and quantitative indicators derived from the framework that ultimately served to paint the overall picture of the countries' development. A full list of indicators can be found in Cedefop (2020, p. 68ff). Combining the three-perspective model with the scenario-model allowed us to arrive simultaneously at both a holistic and also a structured view of changes in VET. That way the framework has proven to be particularly suited to 'clearing the ground' for policy work and, as such, provides a model for how research can support policy. The framework has repeatedly helped at to structure policy debates and strategic thinking, both at European and national levels. The application at regional level is still pending.

CHAPTER 5.

Outlook: from descriptive to explanatory framework

The examples in the previous chapter have shown the variety of ways in which the framework can be adapted and applied in comparative contexts, whether for cross-country comparison, comparison over time, or both, as in the case of country trajectories. At the same time, it can be applied to different layers of analysis, e.g. concepts and aims or empirical contexts, as a means of identifying relevant data and facts and analysing their relationships.

In Chapter 3 we introduced the metaphor of ‘zooming in’, the two modes, also illustrating how the framework can be used in order to understand and explain VET in contexts. However, it is still a shortcoming of the framework that it addresses broader societal, economic or technological changes, such as digitalisation and its relationship to the changing role of VET, only vaguely and implicitly. The emphasis was on describing and analysing VET as comprehensively as possible. Accordingly, we have so far focused on developing an accurate model of VET rather than on mapping the influence of societal drivers. To overcome this shortcoming, we need to re-examine and further elaborate the factors or drivers impacting VET (Cedefop, 2018) beyond those that are already addressed in our framework. Hence, we need to further develop the framework in the future to better understand the processes by which drivers influence VET.

5.1. Drivers of VET

It has proven helpful to make a conceptual distinction between broad PESTLE-type drivers (political, environmental, social, technological, legal and economic factors) that exist outside VET and the pressures for change or trends that these cause within VET itself (distinguishing between drivers and the changes that result from them). This conceptualisation recognises that external drivers can become internalised within VET, leading to changes in policy and practice and helps to distinguish between external structural drivers and internal contingent changes within VET. In this conceptualisation, trends within VET do not have what we might term original autonomy but they may be able to accrue autonomy and have something of a ‘life of their own’ once they become custom and practice within VET. In some cases, there might also be an effect of VET on those drivers that are

considered to be external, e.g. when a certain way of organising programmes and qualifications leads to a certain way of organising work in a company, or when the existence of 'skills' in a certain region or sector might attract investments or increase entrepreneurial activity. In terms of the PESTLE framework, there may be internal political and legal drivers within VET, but externally there will also be broader political and legal drivers such as general government austerity cuts or fiscal investments and wider frameworks related to the relationships between tiers of government ⁽²⁷⁾.

External drivers and the internal changes and trends within VET can be mapped empirically to improve our understanding of VET's response to wider forces. Broadly speaking, drivers can differ in how they interact with the VET system in different ways:

- (a) strengthening the purpose of VET systems, driving up the demand for services (e.g. growing skill gaps induced by technological change);
- (b) undermining a VET system's base, e.g. when manufacturing decline in some European countries removes an important foundation stone for apprenticeships or new forms of platform work which require little training;
- (c) prompting immediate change, for example, when young learners, accustomed to new media and digital tools, demand new forms of VET delivery through digital learning;
- (d) prompting long-run changes, for example societal trends, such as individualisation, which correspond to new concepts of working and learning, e.g. learner-centred didactics.

Ultimately, the crucial questions become those of identifying the variety of factors which influence the delivery of VET in the classroom or workplace – and the extent to which this varies depending upon the school, the teaching community, the particular programme or course being considered – and how this has changed over time. Potentially, it means looking at how institutions at national, regional, local and sectoral levels representing different interests, interact over time – both formally and informally –and how this explains the observed changes in the content, structure, and delivery of VET. Regarding the nature of the changes within VET caused by drivers, it is helpful to distinguish a number of variables (Cedefop, 2022b):

⁽²⁷⁾ In scenario-modelling this distinction would be referred to as 'transactional' scenarios when the relationship of VET and its external drivers is considered bi-directional and 'contextual' scenarios when VET is considered fully and unidirectionally dependent from its external drivers (Grollmann and Markowitsch, 2022).

- (a) the scale of change being introduced, e.g. the share of the overall population affected (how many hybrid qualifications are there and what's their percentage);
- (b) importance, for instance, the extent to which a given change addresses a long-standing weakness in the existing education and training system, or marks a major step forward in the development of the system (provides something common in other countries but largely absent in the country of interest);
- (c) sustainability, have the changes succeeded or been superseded by further rounds of change: policies can fail. As Peters has noted of public policy in general: 'most policies do not solve the problem once and for all. And if they do then the problem addressed was not really a major problem for the society' (Peters, 2018, p. xxii).

5.2. VET actors

The processes by which external drivers lead to new or revised policies and practices within this system are by no means straightforward⁽²⁸⁾: it is not simply a question of policy formulation at national/regional level by government and implementation down the 'hierarchy' to teachers and trainers. Rather than being some objective reality 'policy is constructed through the interactions of actors and through a developed common framework for thinking about policy issues' (Peters, 2018). A bargaining process is involved where each actor involved in implementation 'attempts to negotiate to maximise its own interests and priorities' leading to a constant modification of policies (Barrett and Fudge, 1981)⁽²⁹⁾. Such bargaining is often seen as a process between relevant actors at national level, especially in Europe, as the outcome of bargaining within tripartite social partnership structures involving the state, and the interests of employers and workers (as in the work of Thelen, for example, discussed below).

At the same time, consideration needs to be given to the fact that a practical distinction between policy design and implementation is hard to make: 'As programs are altered by their environments and organisations are affected by their programs, mutual adaptation changes both the context and content of what is implemented' (Pressman and Wildavsky, 1974). Teachers, trainers and school

⁽²⁸⁾ Policy-making has a long-established scholarly literature that seeks to understand the process.

⁽²⁹⁾ A caveat is important here: this literature is overwhelmingly US and UK in origin and will reflect values, processes and institutional frameworks not necessarily found in other countries to the same degree – or at all.

leaders at the front-line of delivery can play a key role in how policies turn out in practice. Lipsky terms them ‘street-level bureaucrats’ (Lipsky, 2010/1980). At this level, actors within VET tend to have high levels of discretion over how VET is delivered since, in Lipsky’s terms, their work involves complex tasks for which rules, guidelines and instructions cannot deal with all eventualities and they often have high degrees of autonomy from organisational authority. Some key current trends may be pulling in different directions in this respect, with learner-centred education pushing in the direction of greater teacher/trainer autonomy but competence-based training pushing against it as a homogenising force.

The notion of the ‘street-level bureaucrat’ draws attention to the fact that what the ‘consumers’ of public services actually experience depends on the actions of front-line delivery staff who have space within rules and policies to adapt services. This idea has particular resonance in education which is a relational service (between teacher and learner) and where adjusting provision in the context of individual learners, classrooms and schools – and in VET’s case workplaces – is key to effectiveness. If teachers perform this key function, they also play a key role in change processes and the evolution of VET systems. These examples from the domain of public policy implementation suggest that the way policies are processed through operational level actors can be important in determining their actual outcomes. This holds even more in the domain of in-company processes, such as work-based learning, where the impact of public policies has the potential to be strongly affected by variables outside the control of State intervention.

There are no simple straight-line paths to be drawn from external drivers to changes in VET. While the literature on policy-making does not pay much regard to how external forces shape policy, it does suggest that there is a considerable role for all actors in the VET system in this process. Applying the concepts, we can see that external drivers are not simply transmitted or filtered through policy ‘top down’ but will also be transmitted ‘bottom up’ from VET provider/company level. For example, it has been noted how much the adoption of digital tools depends on the decisions made by thousands of individual teachers and trainers and not just national policies (European Commission, 2020a). Teachers’ professional bodies are also likely to have a role to play in shaping custom and practice. Though in reality it can be difficult to separate policy from implementation, it is still nevertheless helpful to distinguish between those levels where the dominant concern is policy design and those where practice and content are the pre-eminent issues.

5.3. Incremental and radical change

With this conceptualisation in mind, how does change come about within policy and practice? Here, we need to consider the extent to which change is gradual and incremental or sudden and occurring in steps. Thelen asserts that there is a tendency to think of change in terms of what she terms a 'punctuated equilibrium' model, which 'draws a sharp analytical distinction between long periods of institutional 'stasis' periodically interrupted by some sort of exogenous shock that opens things up, allowing for more or less radical innovation or reorganisation' (Thelen, 2004, pp. xii-xiii). Yet she finds inadequacies in this conceptualisation. Notably, her analysis of institutional change in the skills formation system of Germany shows that subtle and incremental changes can accumulate during periods of comparative calm (settled times) to the point where they amount to significant transformations; and institutional arrangements can be highly resilient to exogenous shocks that we might expect to trigger major changes. In terms of drivers she finds 'ongoing adaptation and renegotiations in response to shifts in the political, market [economic] and social environments', as well as being struck by 'the durability of core elements of the original training system through some rather large disruptions over the 20th century, which in Germany include several regime changes (including into and out of fascism), defeat in two world wars and foreign occupation' (p. xiii). She concludes that 'in times of crisis or deep uncertainty, political actors often specifically eschew experimentation and instead fall back on familiar formulas' (Thelen, 2004, p. 292).

Evidently, there are critical junctures that can play a key role in changing VET systems (perhaps Thelen's conclusions stem from the circumstances of Germany and the particularly deep crises to which the country has been subject). To take one example, the collapse of the guild system in London and the associated decline in apprenticeships have been linked to the Great Fire of London, which destroyed most of the city in the middle of the 17th century. Yet this event intersected with a longer-term decline in the power of guilds to regulate entry into professions ⁽³⁰⁾.

This interaction of sudden disruptive events with existing trends is important: even exogenous events that seem to 'come out of nowhere' do not exist in a vacuum. For instance, one of the most instant effects of COVID-19 has been to force a shift into online learning; yet the trend towards digitalisation has been going on slowly for several decades. In cases such as these, the sudden shock might act as a tipping point, pushing a system across a threshold into a new system state. In

⁽³⁰⁾ [London lives 1690-1800: crime, poverty and social policy in the metropolis.](#)

the case of COVID-19, it is still too early to tell whether this will mark a tipping point for digital learning.

Applying these considerations to VET systems, it is important to understand which features might be undergoing incremental change and which might be more prone to sudden change, where thresholds and tipping points have a key role to play in the nature, scale and timing of change.

5.4. Skill formation regimes and their limits

It is also important to bear in mind the bigger picture of skill formation regimes, which featured prominently in the previous Cedefop *Changing role of VET* project, and what their relationship might be to the politico-administrative approach taken above. The idea of VET or skill systems draws heavily on the notion of ‘varieties of capitalism’. In this conception, countries are seen as highly integrated systems in which there is strong institutional complementarity between component parts, including industrial relations systems, financial systems, corporate governance and VET systems ⁽³¹⁾.

These skill formation regimes can be seen as providing an overarching framework that shapes to varying degrees how external forces lead to changes in VET policy and practice, i.e. the overall ‘skeleton’ within which policy and practice are formed and take place. Not all the features of VET systems are likely to be subject to these wider processes of bargaining and conflict between actors. Not all elements of VET are contested to the same degree by the different parties; what is contested and what is not can vary between countries; and some (new) elements of VET systems might be seen as ‘technocratic’ matters and therefore escape strong political debate. One example is national qualifications frameworks, which have been introduced without much debate in some countries, while in others, for instance Germany, there has been extensive political discussion. Skill formation regimes also shine a light on the potential for systems to show a degree of ‘path dependence’. In this notion, whether change takes place depends partly on how far a given change is consistent with a country’s overall system and the existing positions of actors. Actors or institutions may have strong incentives to reinforce the logic of the system itself, there may be disincentives to critiquing existing arrangements (Pierson, 2000) and system ‘inertia’ may prevail. In these circumstances, the dominant mode of change may be incremental, since sudden radical change might trigger major conflicts between interested parties.

⁽³¹⁾ It is well known that this approach has been successful in classifying only a small number of countries, which raises questions about how useful it is as a general approach to understanding skill regimes.

The idea of skills formation regimes thus provides one context that assists our understanding of change. But there are a few limitations, which consideration of the politico-administrative arrangements may help to offset.

First, classifying countries according to their prevailing policy regime can be useful as it differentiates between rationales relating to the function of VET within a country. However, this approach treats a VET system, and the attendant debate about the purpose and delivery of VET, as a homogeneous whole, which may not necessarily be the case. Different elements (such as economic sectors) of the VET system may have differing histories and face differing challenges to which they respond in different ways (Markowitsch and Hefler, 2018; Oliver et al., 2019). This is not to ignore that there are dominant VET conceptions exerting influence on diverging VET subsystems.

Second, countries of a particular type do not necessarily behave in the same way or follow identical trajectories and may even shift positions. In Sweden, for example, the long tradition of State regulation weakened in the post-1990 period with more individual choice, greater diversity in VET, and more competition between schools (Thunqvist, 2015; Thunqvist et al., 2019). It may be contrasted with that of Norway which has been able to better maintain the corporatist approach which it shared with Sweden until relatively recently. So, even in systems with similarities, different types of political choices might be made which affect the provision of IVET.

Finally, differences between countries at the level of skill regimes may not be decisive in accounting for observed differences in policy and practice. For example, with regard to apprenticeships, the way in which social partners are involved may likely reflect underlying differences that can be linked to ideas related to factors such as 'varieties of capitalism' and conceptions of VET, but how teachers and trainers are trained is unlikely to be related to the skill formation regime to the same extent, if at all.

The influence of skill formation regimes thus needs to be considered alongside the politico-administrative approach set out above; they are complementary perspectives.

5.5. Proposal for a next step

The reflections carried out so far, and the instruments developed in the framework of the projects on the *Changing nature and role of VET* and *The future of VET* by Cedefop over the past few years allow us to take a further step in the direction of a comprehensive theoretical approach to the functioning of VET systems. This would be a matter of taking a first step from a mainly descriptive perspective to a

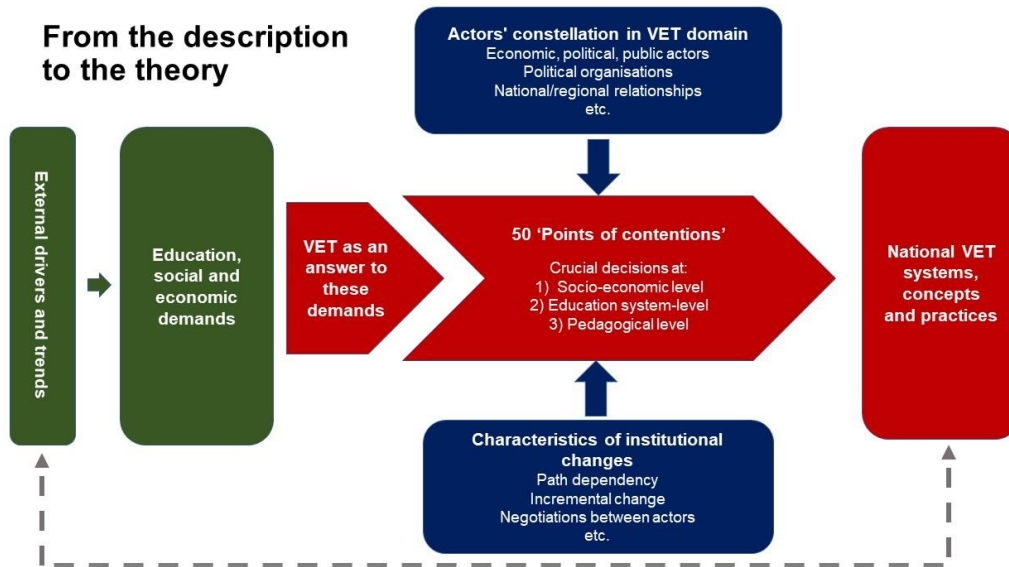
theoretical one; it would allow us not only to describe and understand the specificities of different VET systems, but also to explain why and how these differences appear. The aim would be to use the tools developed so far to build a theoretical approach to VET that can provide a model to explain their specific evolution in a long-term perspective. On a more short-term basis, Mode 2 zooming in (see Chapter 3) can be a basis for formulating and testing hypotheses on relationships between selected different dimensions of the framework. The framework can help reveal or empirically control the contextual conditions for these types of relationships between dimensions.

A long-term perspective will have to be able to answer questions. Why does a particular characteristic become predominant in one country and not in another? How did this or that country adopt this or that measure? Which actors supported it and with what arguments?

The emphasis here will be on the process of change or reform of systems. It is in this that a number of crucial choices, adopted by the different actors in the field and subsequently determining the specificities of the system, become evident.

The key to moving from a descriptive to a theoretical perspective will be a reinterpretation of the different dimensions that Cedefop's three-perspective model has identified. In the framework of this model, the 50 dimensions refer to characteristics of VET systems that need to be identified and that determine their specificities and differences and a step further would be to consider these 50 dimensions as 'neuralgic points of contentions', (we refer here to the expression used by Busemeyer and Trampusch, 2012). In other words, any change in VET must involve choices around the aspects identified in these 50 dimensions. The following figure provides a graphic representation to explain the development of a theoretical approach to VET systems.

Figure 3. From description to a theory of change in VET



Source: Cedefop.

The figure represents the course of a change affecting VET systems. This change may be more or less broad and directly affect a large or a small number of dimensions. However, from a systemic perspective, we can consider that even a small localised adjustment could imply a rebalancing of the whole system, which might be carried out explicitly or implicitly, and which would affect all dimensions.

We can consider that the need for change comes from what we have called drivers and trends (see also PESTLE drivers above). These drivers or trends refer to changes in the socio-political and economic conditions of a country that may raise new demands for education, social integration or types of skills for the economy. In this context of new demands, VET may be identified by politicians and stakeholders, as well as public opinion, as the or one answer to these different demands.

A reform process is then put in place to ensure that VET can meet these expectations. This process follows certain characteristics specific to institutional changes in VET and which may vary from country to country (path dependency, incremental changes, layering etc., as explained above and by Mahoney and Thelen, 2010). However, this process, takes the form of a negotiation between a group of actors, the composition of which may also vary from country to country. These actors find themselves having to make decisions on several issues. Some are directly related to the new demands created by the drivers and trends, others derive from adjustments elsewhere in the system that are required by the changes introduced in response to these demands.

Here, the three-perspective model offers us a wide range of aspects on which actors must make decisions. Depending on the country, decisions on this or that dimension will be easier to take or more debated, or even implicit. A number of these points refer to educational, social or economic policy choices, while others refer more to implementation choices, which confirms the impossibility of distinguishing too clearly between the two levels. Some of these points refer to concrete measures (establishment of new legal bases, establishment of new training plans, establishment of new hiring conditions for teachers, etc.), but other dimensions of the model refer to issues that can only be affected indirectly (reputation of VET or status of teachers, work organisation), but on which certain concrete measures can nevertheless have effects: higher wages of skilled workers, improvement in the working conditions of teachers, in-company training regulations.

The theoretical approach proposed is in line with institutionalist approaches, but these focus exclusively on political-economic aspects and remain at a relatively macro level. For instance, Busemeyer and Trampusch (2012) designate only four neuralgic points: financing, control, provision, and the relationship between general education and IVET. The range of aspects proposed in this paper is much broader, as it allows us to integrate social and pedagogical aspects more widely and also to go into the details of implementation.

The result of such decisions can be a certain state of 'punctuated equilibrium' in the VET system. Such equilibrium, however, is in itself always subject to renegotiation and must be constantly renewed in response to the emergence of new drivers of change.

Acronyms

CAD	computer-aided design
CEE	Central and Eastern Europe
CEN	European Committee for Standardization
CoVE	centre of vocational excellence
CVET	continuing vocational education and training
EQF	European Qualifications Framework
GE	general education
HE	higher education
ISCED	International Standard Classification of Education
IVET	initial vocational education and training
NQF	national qualifications framework
PESTLE	political, environmental, social, technological, legal and economic (factors)
QF-EHEA	Qualifications Framework for the European Higher Education Area
SME	small and medium-sized enterprises
VET	vocational education and training
WPK	work process knowledge

References

- Akkerman, S.F. and Bakker, A. (2011). Learning at the boundary: An introduction. *International Journal of Educational Research*, Vol. 50, No 1, pp. 1-5.
- Akkerman, S.F. and Bakker, A. (2012). Crossing boundaries between school and work during apprenticeships. *Vocations and Learning*, Vol. 5, No 2, pp. 153-173.
- Arundel, A., et al. (2007). How Europe's economies learn: a comparison of work organization and innovation mode for the EU-15. *Industrial and Corporate Change*, Vol. 16, No 6, pp. 1175-1210.
- Barrett, S. and Fudge, C. (1981). *Policy and Action: Essays on the Implementation of Public Policy*. Methuen,
- Beddie, F.M. and Simon, L. (2017). *VET applied research: driving VET's role in the innovation system*. Adelaide: National Centre for Vocational Education Research.
- Bernstein, B. (2003). *Class, codes and contro: volume III: towards a theory of educational transmission*. London: Routledge.
- Billett, S. (2011). *Vocational education: purposes, traditions and prospects*. Dordrecht: Springer.
- Billett, S. (2014). Integrating learning experiences across tertiary education and practice settings: a socio-personal account. *Educational Research Review*, Vol. 12, pp. 1-13.
- Billett, S. (2017). Theorising occupational practice and its learning: Personal, institutional and brute factors. In: Grootenboer, P.E.G., Choy, C.; Sarojni (ed.). *Practice theory perspectives of Education and Pedagogy*. Dordrecht: Springer, pp. 67-86.
- Billett, S., et al. (2018). Developing occupational expertise through everyday work activities and interactions. In: Ericsson, K.A. et al. (eds). *The Cambridge handbook of expertise and expert performance*. Cambridge University Press pp. 105-126.
- Billett, S. and Henderson, A. (eds). (2011). *Developing learning professionals: integrating experiences in university and practice settings: Vol. 7*. Springer.
- Bonoli, L. and Gonon, P. (2022). The evolution of VET systems as a combination of economic, social and educational aims: the case of Swiss VET. *Hungarian Educational Research Journal*, Vol. 12, No 3, pp. 305-316.
- Boreham, N. (2002). Work process knowledge, curriculum control and the work-based route to vocational qualifications. *British journal of educational studies*, Vol. 50, No 2, pp. 225-237.

- Bosch, G. (2016). Typologien nationaler Berufsbildungssysteme [Typologies of national VET systems]. *Zeitschrift für Berufs-und Wirtschaftspädagogik*, Vol. 112, No 1, pp. 15-36.
- Bray, M. and Thomas, R.M. (1995). Levels of comparison in educational studies: Different insights from different literatures and the value of multilevel analyses. *Harvard educational review*, Vol. 65, No 3, pp. 472-491.
- Busemeyer, M.R. and Trampusch, C. (2012). The Comparative Political Economy of Collective Skill Formation. In: Busemeyer, M.R and Trampusch, C. (eds). *The political economy of collective skill formation*. Oxford: Oxford University Press, pp. 3-38.
- Cedefop (2009). *The dynamics of qualifications: defining and renewing occupational and educational standards*. Luxembourg: Publications Office. https://www.cedefop.europa.eu/files/5195_en.pdf
- Cedefop (2013). *Renewing VET provision: understanding feedback mechanisms between initial VET and the labour market*. Luxembourg: Publications Office. Cedefop research paper, No 37. https://www.cedefop.europa.eu/files/5537_en.pdf
- Cedefop (2015). *Ensuring the quality of certification in vocational education and training*. Luxembourg: Publications Office. Cedefop research paper, No 51. <http://dx.doi.org/10.2801/25991>
- Cedefop (2017a). *The changing nature and role of vocational education and training in Europe: volume 1: conceptions of vocational education and training: an analytical framework*. Luxembourg: Publications Office. Cedefop research paper, No 63. <http://dx.doi.org/10.2801/532605>
- Cedefop (2017b). *The changing nature and role of vocational education and training in Europe: volume 2: results of a survey among European VET experts*. Luxembourg: Publications Office. Cedefop research paper, No 64. <http://dx.doi.org/10.2801/548024>
- Cedefop (2018). *The changing nature and role of vocational education and training in Europe: volume 3: the responsiveness of European VET systems to external change (1995-2015)*. Luxembourg: Publications Office. Cedefop research paper, No 64. <http://data.europa.eu/doi/10.2801/621137>
- Cedefop (2019a). *Cedefop's analytical framework for apprenticeships*. Luxembourg: Publications Office. https://www.cedefop.europa.eu/files/8130_en.pdf
- Cedefop (2019b). *The changing nature and role of vocational education and training in Europe: volume 6: vocationally oriented education and training at higher education level: expansion and diversification in European countries*. Luxembourg: Publication Office. Cedefop research paper, No 70. <http://data.europa.eu/doi/10.2801/02004>
- Cedefop (2020a). *Empowering adults through upskilling and reskilling pathways: volume 1: adult population with potential for upskilling and reskilling*.

- Luxembourg: Publications Office. *Cedefop reference series, No 112*. <http://data.europa.eu/doi/10.2801/475393>
- Cedefop (2020b). *Vocational education and training in Europe, 1995-2035: Scenarios for European vocational education and training in the 21st century*. Luxembourg: Publications Office. <http://data.europa.eu/doi/10.2801/794471>
- Cedefop (2022a). *The future of vocational education and training in Europe: volume 1: the changing content and profile of VET: epistemological challenges and opportunities*. Luxembourg: Publications Office. Cedefop research paper; No 83. <http://data.europa.eu/doi/10.2801/215705>
- Cedefop (2022b). *The future of vocational education and training in Europe: volume 2: delivering IVET: institutional diversification and/or expansion?* Luxembourg: Publications Office. Cedefop research paper, No 84. <http://data.europa.eu/doi/10.2801/780431>
- Cedefop (2022c). *The future of vocational education and training in Europe: volume 3: the influence of assessments on vocational learning*. Luxembourg: Publications Office. Cedefop research paper, No 90. <https://www.cedefop.europa.eu/en/publications/5590>
- Cedefop (2023, forthcoming). *The future of VET: facilitating vocational learning: delivering lifelong learning: the changing relationship between IVET and CVET* [working title]. Luxembourg: Publication Office. Cedefop research paper.
- Clarke, L. et al. (2021). Comparative VET European research since the 1980s: accommodating changes in VET systems and labour markets. *Journal of Vocational Education and Training*, Vol. 73, No 2, pp. 295-315.
- Curtain, R. (2004). *Vocational education and training, innovation and globalisation*. Adelaide: National Centre for Vocational Education Research.
- Dietzen, A. (2017). Knowledge Concepts in Competence-based VET Research Perspectives on Cognitivist and Social-Constructivist Approaches. In: Mulder, M. (ed.). *Competence-based vocational and professional education*. Cham: Springer Vol. 23, pp. 719-737.
- Dietzen, A. (2020). Implizites Wissen, Arbeitsvermögen und berufliche Handlungskompetenz [Tacit knowing, work capacity and vocational competence]. In: Hermkes, R. et al. (eds). *Implizites Wissen: Berufs- und wirtschaftspädagogische Annäherungen*. Bielefeld: wbv Media (Wirtschaft – Beruf – Ethik, 38), pp. 87-107.
- European Commission (2020a). *Innovation and digitalisation: a report of the ET 2020 Working Group on Vocational Education and Training (VET): eight insights for pioneering new approaches*. Luxembourg: Publication Office. <https://ec.europa.eu/social/main.jsp?catId=738&langId=en&pubId=8365>
- European Commission (2020b). *Prospective report on the future of assessment in primary and secondary education: report prepared by PPMI*. Luxembourg: Publications Office. <https://data.europa.eu/doi/10.2766/3774>


- Fischer, M. (2000). *Von der Arbeitserfahrung zum Arbeitsprozeßwissen. Rechnergestützte Facharbeit im Kontext beruflichen Lernens* [From work experience to work process knowledge. Computer-aided skilled work in the context of vocational learning]. Opladen: Leske & Budrich.
- Fischer, M. and Bauer, W. (2007). Competing Approaches towards Work Process Orientation in German Curriculum Development. *European journal of vocational training*, Vol. 40, No 1, pp. 140-157.
- Gessler, M. and Howe, F. (2015). From the reality of work to grounded work-based learning in German VET: background, concept and tools. *International Journal for Research in Vocational Education and Training (IJRVET)*, Vol. 2, No 3, pp. 214-238. <https://doi.org/10.13152/IJRVET.2.3.6>
- Gibbons, M., et al. (1994). *The new production of knowledge: the dynamics of science and research in contemporary societies*. Sage.
- Gonon, P. (2016). Zur Dynamik und Typologie von Berufsbildungssystemen: eine internationale Perspektive [On the dynamic and typology of VET systems: an international perspective]. *Zeitschrift für Pädagogik*, Vol. 62, No 3, pp. 307-322.
- Greinert, W.D. and Hanf, G. (2004). The rise of national VET systems in a comparative perspective. In: Cedefop. *Towards a history of vocational education and Training (VET) in Europe in a comparative perspective Proceedings of the first international conference October 2002, Florence: volume 1*. Luxembourg: Official Publication. https://www.cedefop.europa.eu/files/5153_1_en.pdf
- Griffiths, T. and Guile, D. (2003). A connective model of learning: the implications for work process knowledge. *European educational research journal*, Vol. 2, No 1, pp. 56-73.
- Grollmann, P. (2008). Quality of Vocational Teachers: teacher education, institutional roles and professional reality. *European Educational Research Journal* Vol. 7, No 4. <https://doi.org/10.2304/eej.2008.7.4.535>
- Grollmann, P. (2018). Varieties of 'duality': work-based learning and vocational education in international comparative research. In: *Integration of vocational education and training experiences*. Springer, pp. 63-82.
- Grollmann, P. and Markowitsch, J. (2022). Methodological choices in developing scenarios in vocational education and training: reflections on three European scenario projects. *Hungarian Educational Research Journal*, Vol. 12, No 3, pp. 290-304. <https://doi.org/10.1556/063.2021.00054>
- Grollmann, P. and Sellin, B. (1999). Zum Stand der Berufsbildungsforschung in Europa, ihren Funktionen und Problemen. *Europäische Zeitschrift für Berufsbildung*, No 17, pp. 71-76.
- Guile, D. and Evans, K. (2010). Putting Knowledge to Work: re-contextualising knowledge through the design and implementation of work-based learning at higher education levels. *UK ESRC report*.

- Harteis, C. (2018). *The impact of digitalization on the workplace: an educational view*. Paderborn: Springer.
- Hefler, G. and Markowitsch, J. (2013). Seven types of formal adult education and their organisational fields: towards a comparative framework. In: Saar, E. et al. (eds). *Lifelong learning in Europe: national patterns and challenges*. Cheltenham: Edward Elgar, pp. 82-113.
- Holm, J.R., et al. (2010). Organizational learning and systems of labor market regulation in Europe. *Industrial and Corporate Change*, Vol. 19, No 4, pp. 1141-1173.
- Hordern, J. (2016). Differentiating knowledge, differentiating (occupational) practice. *Journal of Vocational Education and Training*, Vol. 68, No 4, pp. 453-469.
- Johansen, I. (2018). Scenario modelling with morphological analysis. *Technological Forecasting and Social Change*, Vol. 126, pp. 116-125. <https://doi.org/10.1016/j.techfore.2017.05.016>
- Johnson Jr, J. (2019). *Zwicky: the outcast genius who unmasked the universe*. Harvard University Press.
- Journell, W. (2007). Dewey and standardization: a philosophical look at the implications for social studies. *Social Studies Research and Practice*, Vol. 3, No 2, pp. 301-315. https://libres.uncg.edu/ir/uncg/f/W_Journell_Dewey_2007.pdf
- Käpplinger, B. (2011). *Kriterienraster für eine vergleichende Effekte- und Nutzenforschung in der beruflichen Weiterbildung für Betriebe und Beschäftigte* [Criteria grid for comparative effects and benefits research in CVET for companies and employees] Effekte von nationalen Förderprogrammen der beruflichen Weiterbildung, No 1.
- Klein, D. (2007). A quarter century of US 'math wars' and political partisanship. *BSHM Bulletin*, Vol. 22, No 1, pp. 22-33.
- Kruse, W. (1987). Betrieb als permanentes Laboratorium [The company as permanent laboratory]. *Lernfeld Betrieb* No 3.
- Kuhlee, D. and Winch, C. (2017). Teachers' knowledge in England and Germany: the conceptual background. In: F. J. and W. G. (eds). *Knowledge and the study of education around the world: an international exploration*. Oxford: Symposium Books, pp. 231-254.
- Lappalainen, S. et al. (2019). Imagining societies through discourses on educational equality: a cross-cultural analysis of Finnish and Swedish upper secondary curricula from 1970 to the 2010s. *European Educational Research Journal*, Vol. 18, No 3, pp. 335-354.
- Lauterbach, U. (2003). *Vergleichende Berufsbildungsforschung: Theorien, Methodologien und Ertrag am Beispiel der vergleichenden Berufs- und Wirtschaftspädagogik mit Bezug auf die korrespondierende Disziplin comparative education/vergleichende Erziehungswissenschaft* [Comparative

- VET research: theories, methodologies and outcomes]. Baden-Baden: Nomos-Verlag.
- Lauterbach, U. and Sellin, B. (2000). *Vergleichende Berufsbildungsforschung in Europa. Ansätze, Politikbezüge und Innovationstransfer*. [Comparative VET research in Europe. Approaches, policy references and innovation transfer].
- Lipsky, M. (2010/1980). *Street-level bureaucracy: dilemmas of the individual in public services: 30th anniversary expanded edition*. New York: Russell Sage Foundation.
- Loo, S. (2020). *Multiple dimensions of teaching and learning for occupational practice*. Routledge.
- Mahoney, J. and Thelen, K. (2010). A theory of gradual institutional change. *Explaining institutional change: ambiguity, agency, and power*, Vol. 1, pp. 1-37.
- Markowitsch, J. and Chan, R. (2021). Elucidating responsiveness: reviewing empirical methods for comparative studies of governance in vocational education and training. In: Gonon, P. and Bürgi, R. (eds). *Governance revisited: vocational education and training* Bern: Peter Lang, pp. 379-415.
- Markowitsch, J. and Hefler, G. (2018). Staying in the loop: formal feedback mechanisms connecting vocational training to the world of work in Europe *International Journal for Research in Vocational Education and Training*, Vol. 5, Issue 4, No 285-306. <https://dx.doi.org/10.13152/IJRVET.5.4.3>
- Maurice, M., et al. (1986). *The social foundations of industrial power: a comparison of France and Germany*. Cambridge, MA: MIT Press.
- Moodie, G. (2008). *From vocational to higher education: an international perspective*. SRHE and Open University Press.
- Neuweg, G.H. (2004). Tacit knowing and implicit learning. In: Fischer, M. et al. (eds). *European perspectives on learning at work: The acquisition of work process knowledge*. Luxemburg: Publications Office, pp. 130-147.
- Nickolaus, R., et al. (2005). Ergebnisse empirischer Untersuchungen zu Effekten methodischer Grundentscheidungen auf die Kompetenz- und Motivationsentwicklung in gewerblich-technischen Berufsschulen [Results of empirical studies on the effects of basic methodological decisions on the development of competence and motivation in industrial-technical vocational schools]. *Zeitschrift für Berufs- und Wirtschaftspädagogik*, Vol. 101, No 1, pp. 58-78.
- Nicolini, D. (2009). Zooming in and out: Studying practices by switching theoretical lenses and trailing connections. *Organization studies*, Vol. 30, No 12, pp. 1391-1418.
- Nicolini, D. (2012). *Practice theory, work, and organization: an introduction*. Oxford: OUP Oxford.
- Nylund, M. and Virolainen, M. (2019). Balancing 'flexibility' and 'employability': the changing role of general studies in the Finnish and Swedish VET curricula of

- the 1990s and 2010s. *European Educational Research Journal*, Vol. 18, No 3, pp. 314-334.
- OECD (2013). *Synergies for better learning. an international perspective on evaluation and assessment*. Paris: OECD Publishing.
- Oliver, D. et al. (2019). Political economy of vocational education and training. In: Guile, D. and Unwin, L. (eds). *The Wiley Handbook of Vocational Education and Training*. Wiley Blackwell, pp. 115-136.
- Peters, B.G. (2018). Introduction. In: Wildavsky, A.B. (ed.). *The art and craft of policy analysis*. Palgrave Macmillan.
- Pierson, P. (2000). Increasing returns, path dependence and the study of politics. *The American Political Science Review* Vol. 94, No 2, pp. 251-267. <https://doi.org/10.2307/2586011>
- Polanyi, M. (1958). *Personal knowledge: towards a post-critical philosophy*. Routledge.
- Pressman, J.L. and Wildavsky, A.B. (1974). *Implementation*. Berkeley: University of California Press.
- Psfidou, I. (2014). Redesigning curricula across Europe: implications for learners' assessment in vocational education and training. In: *Empires, post-coloniality and interculturality*. Brill Sense, pp. 135-150.
- Rageth, L. and Renold, U. (2017). *The linkage between the education and employment systems: ideal types of vocational education and training programs*. KOF Working Papers.
- Ravitch, D. (1995). *National standards in American education: a citizen's guide*. Washington, DC: Brookings Inst. Press.
- Riley, S. (2017). *The types of assessment for learning*. EducationCloset. <https://educationcloset.com/2017/07/01/types-assessment-learning/>
- Ritchey, T. (2011). *Wicked problems—social messes: decision support modelling with morphological analysis*. Berlin/Heidelberg: Springer
- Rojewski, J.W. (2002). *Preparing the workforce of tomorrow: a conceptual framework for career and technical education*. Columbus: National Dissemination Center for Career and Technical Education.
- Rojewski, J.W. (2009). A conceptual framework for technical and vocational education and training. In: Maclean, R. and W. D. (eds). *International handbook of education for the changing world of work*. Springer, Vol. 1, pp. 19-39.
- Ryle, G. (1949). *The concept of mind*. London: Routledge.
- Sayer, A. (1992). *Method in social science: a realist approach*. Routledge.
- Stasz, C. (2001). Assessing skills for work: two perspectives. *Oxford Economic Papers*, Vol. 53, No 3, pp. 385-405.
- Stenström, M. et al. (2006). Practice-oriented assessment in Finnish VET: towards quality assurance through vocational skills demonstrations. In: *Quality and*

- practice in assessment: new approaches in work-related learning*. Jyväskylä: University Press, pp. 89-120.
- Thelen, K. (2004). *How institutions evolve: the political economy of skills in Germany, Britain, the United States, and Japan*. Cambridge: Cambridge University Press.
- Thunqvist, D.P. (2015). *Bridging the gaps: recent reforms and innovations in Swedish VET to handle the current challenges*. Roskilde.
- Thunqvist, D.P. et al. (2019). A tale of two reforms: institutional change in vocational education and training in Norway and Sweden in the 1990s. *European Educational Research Journal*, Vol. 18, No 3, pp. 298– 313.
- Tütlys, V., et al. (eds). (2022). *Skill formation in Central and Eastern Europe: a search for patterns and directions of development*. Peter Lang.
- Wheelahan, L. (2010). *Why knowledge matters in curriculum: a social realist argument*. London: Routledge.
- Winch, C. (2010). *Dimensions of expertise: a conceptual exploration of vocational knowledge*. Bloomsbury Publishing.
- Wittig, W. (2022). The changing epistemology of VET: reflections on analysing content change. *Hungarian Educational Research Journal*, No 12, pp. 276–289. <https://doi.org/10.1556/063.2021.00043>
- Young, M. (2008a). *Bringing knowledge back in: from social constructivism to social realism in the sociology of education*. Routledge.
- Young, M. (2008b). From constructivism to realism in the sociology of the curriculum. *Review in research in education*, Vol. 32, pp. 1-28.
- Zwicky, F. (1969). *Discovery, invention, research through the morphological approach*. Toronto: Macmillan.



The future of vocational education and training in Europe

50 dimensions of vocational education and training: Cedefop's analytical framework for comparing VET

This report presents a holistic approach to understanding and comparing vocational education and training (VET) systems. The approach has been developed jointly by a group of interdisciplinary VET researchers over a 5-year period as part of Cedefop's research on the future of VET and has been reviewed several times. The framework introduces 50 dimensions for analysing VET systems, as well as parts of them, structured according to three overlapping main perspectives: epistemological and pedagogical, education system, and socioeconomic or labour market. The framework is particularly suited to 'clearing the ground' for policy work and provides a model for how research can support policy. This model can be flexibly adapted and applied in any comparative research or international policy learning activity related to VET.

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