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Comparative VET European research since the 1980s: accommodating changes in VET systems and labour markets

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ABSTRACT

The article assesses the role comparative research plays from the 1980s in understanding vocational education and training (VET) systems in Europe, driven by political, economic, social and labour market changes. This research has been transformed, moving from national comparisons of VET systems, grounded in institutional theory and engaging with convergence versus divergence debates or human capital theory, to the varieties of capitalism approach considering groups of countries as representative of particular capitalist economies, to transcending national boundaries and emphasising capitalist diversity, governance and labour agency. Drawing on examples of research in which the authors and others have been involved, particularly on the construction industry, the article traces this development and shows how, despite governance weaknesses, comparative research has been enriched by the addition of a European Union level through the introduction of tools, such as the European Qualifications Framework. Four dimensions are proposed – labour market, governance, education and competence – capable of identifying VET ‘families’ and intra-national variations and capturing the dynamics of VET systems. Through a multi-dimensional and multi-level framework, comparative VET research can provide a deeper understanding of how and why VET systems respond to the challenges of technological, economic and environmental change.

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Introduction

This article assesses the role comparative research plays in understanding changes in vocational education and training (VET) in Europe and assumptions on which this has been based. VET is broadly defined at European level as preparing learners for employment, traditionally non-academic, and related to a specific occupation or vocation, the focus here being particularly on initial rather than continuing VET. Our aim is to trace the development of comparative

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VET research in Europe and identify key dimensions applied to explain differences between VET systems, their interrelation and changing relevance, and ultimately the drivers of change and possible future direction for research.

Since the 1980s, comparative VET research has been transformed, driven by political, economic, social and labour market changes across Europe. Research has moved on from national comparisons of VET systems grounded in human capital theory (Becker 1993; Prais and Wagner 1983), where the firm and skills development were the primary focus. With institutional theory (e.g. Lutz 1976; Maurice, Sellier, and Silvestre 1986), firms were set in the wider context of the labour market and governance issues, and comparative VET research engaged with debates concerning whether systems were converging or diverging (e.g. Campinos-Dubernet and Grando 1991; Green 1995, 1997). With the turn of the millennium, the varieties of capitalism (VoC) approach came to dominate institutionalist research, considering groups of countries as representative of particular capitalist economies and hence VET systems (e.g. Hall and Soskice 2001). More recently, comparative approaches have transcended national boundaries, placing greater emphasis on variegated capitalism, hybrid VET and qualification systems, and labour agency, including social inclusion and different union strategies (e.g. Jessop 2011, 2015; Deissinger et al. 2013; Deissinger 2015; Jørgensen, Olsen, and Thunqvist 2018; Michelsen and Stenström 2018; Durazzi and Geyer 2019).

Already, therefore, this crude sketch of development indicates key dimensions addressed in European VET comparative research, including: firms, labour market, governance, skills development, qualifications and the VET system itself. In tracing this development and testing out the relevance of different dimensions to understanding changes, the article seeks to discern the direction of change. It draws on examples of comparative VET research by ourselves and other authors, often focussed particularly on the construction sector, and represents a critical assessment of what has been achieved. In this respect, it is perhaps a somewhat skewed assessment, related particularly to our own experience of comparative VET research, much of which has focused on particular countries and sectors, especially construction, and on European-wide qualification frameworks.

One explanation for changes in the research direction is the greater role played by the European Union (EU) in VET and the impact of EU enlargement. This has inevitably added a further higher level to the regional, state, local and sectoral ones at which different dimensions are examined, and extended the geographical scope of research through the introduction of the central and east European (CEE) states. Despite VET being a 'no-competence' issue, the EU has increasingly sought to influence national qualification systems (Rainbird 1993; Heyes and Rainbird 2009; Clarke and Winch 2006), for instance through introducing the European Qualifications Framework (EQF) and more recently the European Skills/Competences and Occupations (ESCO) classification. These initiatives and a more coherent social dimension to EU policy opened up the

possibility of greater European convergence, including concerning VET and qualifications, despite significant divergence between countries (Gold 2009).

Labour market changes, in particular the principle of freedom of movement for labour, have had a significant impact on VET across Europe and on research to compare different VET systems. As labour became increasingly mobile, particularly for an industry like construction, EU and national governments sought to recognise the skills and qualifications of labour. Comparative research on the nature of the VET systems underpinning these thus assumed more importance, including by highlighting good practices. Alongside greater labour mobility, the gradual disappearance of life-time employment in a single firm and with it the significance of internal labour markets to skills development, employer disengagement from training, and the demise of the standard employment contract, have transformed the labour market (Keep and Gleeson 2004; Bolli et al. 2018; EC 2018a). This has in turn changed its relation to the VET system as the work-based training infrastructure began evaporating, despite efforts to revive apprenticeship (Steedman 2010; ETUI 2016; Durazzi and Geyer 2019).

Throughout Europe, such changes are evident, varying according to employment regime and sector and posing a threat to VET arrangements continuing to be premised on individual employer and employee relations, internal labour markets and social partnership (Gallie 2007; Marsden 1999, 2007; Emmenegger and Seitzl 2020). The changing direction of comparative VET research reflects this transformation, ceasing to focus on national specificities and becoming increasingly concerned with diversity within and between systems (e.g. Jørgensen, Olsen, and Thunqvist 2018; Clarke, Sahin-Dikmen, and Winch 2020), VET quality and the knowledge, skills and competences entailed (e.g. Winterton, Delamare-Le Deist, and Stringfellow 2006; Brockmann et al. 2011), how far VET reflects labour process developments (e.g. Clarke et al. 2019), educational standards as opposed to performance outcomes (e.g. Brockmann, Clarke, and Winch 2008), governance issues (e.g. Kuhlee and Laczik 2015), and broader concepts of labour agency (e.g. Winch 2014). At the same time, emphasis has been placed on the need to understand different levels of analysis in an international perspective, including the linkage between macro and micro levels (e.g. Niemeyer 2007), as well as the endurance of national characteristics in face of convergence pressures (e.g. Gonon 2016). Thus, the dimensions of research have expanded considerably to encompass also competences, the role of education, and developments in the labour process.

Comparative VET research is marked by a long search for sets of categories to grasp and understand the most striking differences between systems (e.g. Green 1997; Durazzi and Geyer 2019). This is clearly expressed in Greinert's (2002) basic dimensions of school-based, market and dual vocational training models in terms of work culture, legitimation, regulation, and didactic orientation. However, despite the differences, all national VET systems face similar challenges, such as new technologies or pressures from higher education, though situational path dependencies filter the effects differently between or within countries. Further

multi-dimensional comparative studies are needed to understand the future trajectory of and challenges to VET in Europe, given these general dynamics and variations in responses.

The article concludes by considering whether these challenges can be resolved within the VET system or are better addressed in relation to the overall education system and the employment system, and whether this is at local, national or European government levels. Whichever the direction has important implications for comparative VET research, implying a multi-dimensional approach no longer just focussed on discovering national 'identities' or even clusters of 'identities', expressed in structural and conceptual differences between individual or groups of states, but addressing instead trans- and intra-national VET and labour market issues, disparities, concepts, competences and modes of regulation.

Changes in the direction of comparative VET research

The changing direction of comparative VET research over the past four decades is visible from construction sector studies, which have long constituted an important component of this body of work, given the importance of the industry in every country for Gross Domestic Product (GDP) (7–9%) and employment (10–12% of the workforce) and its dependence on a skilled workforce. Indeed, with mechanisation, prefabrication, energy efficiency and the increasing complexity of the construction process, the proportion of labourers has steadily decreased and the labour process become more abstract, less reliant on manual, physical labour and more on qualified labour (Clarke and Wall 1996; EC 2014; Clarke, Sahin-Dikmen, and Winch 2020), posing important research questions concerning how VET responds to, and even drives, labour process changes.

Some of the first systematic European comparisons of construction VET were conducted in the 1980s at the National Institute for Economic and Social Research (NIESR) (Prais and Wagner 1983; Prais and Steedman 1986). These followed a human capital approach and compared in particular the syllabi, assessment methods, scope and provision of VET systems and their consequences for productivity. They showed the general weakness of sector-based employer organisations and the VET system in Britain compared to Germany in the level of training, scope, adaptability to change, technical knowledge and mathematics (Steedman 1992, 1998). At the same time as this NIESR work, the *Centre d'études et des recherches sur les qualifications* (CEREQ) in France conducted a project to compare construction VET systems and their relation to the construction labour market in four countries: Britain, France, Italy and West Germany. In contrast to the NIESR, the CEREQ study drew on French *régulation* theory (Boyer 1980), which had proved its analytical effectiveness in studying employment levels and in cross-national comparisons of wage structures. The CEREQ (1991) study similarly highlighted what was to become a familiar feature when comparing VET in these countries, namely the strength of the German and French as opposed to the British (and Italian) VET systems. Indeed, the contrast

between the British and Germany systems was to become a common theme in comparative VET research, including in Ryan's (1991) important work on intermediate skills.

The CEREQ (Centre d'études et des recherches sur les qualifications) (1991) study applied régulation theory at sectoral level and, by comparing labour organisation and skills reproduction, revealed national specificities due to institutional differences, themselves historically based. At the same time, the contention that employment levels and the specificity of wage relations in construction in France were attributable to its technological backwardness was tested. The 'societal effect' method developed by Maurice, Sellier, and Silvestre (1986) in a study of apparently similar factories in France and Germany was used to compare the countries. This challenged human capital theory for regarding the 'skills' or 'human capital' of the workforce as the property of individual workers and associated with the work processes of particular firms. It was argued that the consequent neglect of wider social structures forming and constraining the quantity and quality of labour implies a narrow concept of 'skills' that ignores the complexities of 'skill formation' at different levels, including the socialisation of labour into production through structures of employment, wage relations, and training (Campinos-Dubernet and Grando 1991). Maurice, Sellier, and Silvestre (1986) also challenged convergence theories, which maintained that with globalisation societies and institutions develop increasingly similar structures (Inkeles and Sirowy 1983), discovering instead no homogenisation of French and German work relations. As with many comparative studies, therefore, this fell firmly on the side of diverging systems in the convergence-divergence debate, claiming that national specificities are maintained through relations in education, training, and promotion. In detailing the diversity of wage relations (the 'societal effect') between countries, the study found that 'skills' reproduction, an aspect largely ignored in régulation theories, plays a crucial role in the homogenisation/differentiation of labour, influencing wage scales, work organisation and labour mobility (CEREQ 1991).

CEREQ research set an important standard, theoretically and empirically, for what comparative analysis at sectoral level could achieve. It also raised questions, including: Is stereotyping nationalities and inevitably accentuating national differences helpful? Are there not also conceptual as well as institutional differences in VET between states? And what about disparities *within* and similarities between states – are these not obscured in such comparative studies? Biernacki's (1995) seminal book on *the Fabrication of Labour*, comparing the historical development of the German and British textile sectors, addresses the second question, in revealing clear conceptual differences in the meaning of 'labour', which he termed respectively 'labour power' – defined in relation to capabilities and qualifications – and 'embodied labour' – defined in relation to output in the workplace. Marsden's (1999) distinction between 'training' and a 'production' approaches echoes this, whereby a 'training approach' is institutionally regulated, related to individuals' ability and certified qualifications, usually collectively and industrially organised and long-term, by

equipping them over a working life to operate in specific occupations and sectors. This contrasts with a 'production' approach, where 'skills' are work-based and firm-specific, with training largely dependent on individual employers and on-the-job learning.

In our own comparative research on construction VET throughout the 1990s and 2000s, just as with VET research more generally (Niemeyer 2007; Gonon 2016), the identification of institutional (e.g. Clarke and Herrmann 2004) and conceptual (e.g. Clarke and Winch 2007) differences between countries played a critical role. Our study of bricklaying in eight European countries, for instance, extended beyond Marsden's typology in identifying qualitative differences between 'occupational' as opposed to 'skills'-based approaches to VET (Clarke, Winch, and Brockmann 2013). An 'occupational' approach rests on a statutory framework, social partnership, recognised qualifications, comprehensive, broad and recognised VET programmes, multi-dimensional competence, occupational capacity and knowledge, general and civic education, permeability, occupational labour markets, and learning outcome as an educational standard related to curriculum content. In contrast, a 'skill-based' approach rests on a weak statutory framework and marginal stakeholder involvement, and is characterised as employer-based, with poor labour market currency, fragmented narrow skill sets, a functionalist-behaviourist conception of competence built on task descriptors, minimal underpinning knowledge, remedial functional skills, a general neglect of general/civic education, lack of permeability, and learning outcomes as performance criteria related to defined workplace tasks.

Such starkly contrasting approaches, underpinned by empirical research, reflect labour market differences, including the structure and organisation of firms, employment status of construction workers, degree of supervision required, industrial relations, and productivity (Brockmann, Clarke, and Winch 2010). They resemble Rauner's (2007) distinction between VET systems educating for an occupation (*Berufliche Bildung*) and the 'employability' of individuals, as well as the dilemmas highlighted by Jørgensen, Olsen, and Thunqvist (2018) within VET in the Nordic countries in meeting the challenges of, on the one hand, social equality to achieve parity of esteem with academic programmes and, on the other, social inclusion to reduce unemployment. Such contrasting approaches are not necessarily nationally, or even sectorally, specific, as groups of countries with similar features are identifiable – as in the Nuffield Foundation and bricklaying studies (Brockmann, Clarke, and Winch 2010; Brockmann et al. 2011) – just as are sharp disparities in VET and employment within national construction industries. The contrasts revealed in these studies echo Hall and Soskice (2001) distinction between liberal and co-ordinated market economies (LMEs and CMEs), though going beyond this in using four comparators: education, governance, labour market and competence system. Building closely on the VoC approach, Bosch and Charest (2008) showed continued divergence of VET systems globally resulting from differences in industrial relations, welfare

systems and product markets. CMEs, characterised by a high level of social partnership, could reform their VET systems in line with economic challenges and strategic innovation, whilst initial VET in LMEs was marginalised with increased emphasis placed on general and higher education, albeit often vocational in nature.

The VoC approach has been criticised for its apolitical, institutionalist and firm-centred approach, viewing labour as passive factor of production and ignoring potential antagonisms in capital-labour relations in the production sphere (Ebenau, Bruff, and May 2015). Such shortcomings gave rise to the 'variegated capitalism' approach, transcending the VoC debate by explaining similarities and differences in capitalism through focussing on the inequalities and class struggles underpinning institutions. Whilst placing greater emphasis on labour agency, this approach remains nevertheless embedded in an institutionalist framework that fails to grasp extra-economic conditions of capitalist reproduction and the improbability of stability given inherent contradictions leading to crises (Jessop 2011). The new approach even strays away from VoC's emphasis on skill formation and VET, playing down the roles of abstract labour and supplementary modes of reproduction, regulation and governance and ignoring the balance of 'within-type' and 'between-type' variation (Lane and Wood 2009).

An institutionalist perspective, in particular the focus on national specificities, can become a straightjacket in comparative VET research in its inability to explain regulatory change and consider disparities and contradictions within VET and employment systems, as well as broad concepts of agency embracing competences and notions of abstract labour. As stressed by Jørgensen, Olsen, and Thunqvist (2018), inspired by the earlier work of Lutz (1991), comparisons of VET systems need to shift from a synchronic perspective, whereby they are conceived as discrete entities each having its own particular inner logic, to a diachronic perspective comparing how systems develop as they address common challenges. Disparate forms do not, however, exist in isolation but interact, though occupying different spatial and temporal spheres, reflecting not only the variegated and polymorphic nature of capitalist development but what Ernst Bloch termed its 'polyrhythmic formation' (Durst 2002). Such considerations point to a multi-dimensional framework encompassing disparities, as applied in our research on VET for low energy construction (LEC) in eight European countries (Clarke et al. 2019). This highlighted the contradictions within VET systems and between these and the labour market as they confront climate change and the need to transform in order to impart the knowledge, skills and competences required for net zero energy building (NZEB).

Introducing the European level into comparative VET research

In VET comparisons, therefore, the production of dichotomous typologies of capitalist systems has been in the foreground. However, the development of European-wide VET policy tools from 2000 onwards posed new challenges to

cross national research, including the task of developing a suitable methodology. Though with limited powers, the EU is an actor alongside the individual countries composing it. This means that to do justice to diversity and make meaningful comparisons within and between countries, a particularly robust comparative framework is needed, capable of comparing EU intentions and policies with developments within and between national contexts.

Although the Treaties do not mandate legal powers in this area, the European Community originally sought mutual recognition of vocational qualifications across Europe so that the labour market became readily accessible and the free movement of labour could be realised. This began in the 1980s with attempts by the European Centre for the Development of Vocational Training (CEDEFOP) to compare key competences required for different occupations (Paulsen 2007). When these attempts stalled, and having established a common framework for higher education in the 1990s, the goal turned from top-down harmonisation to bottom-up transparency through establishing the equivalence of national vocational qualifications. Initially the policy to develop transparency instruments arose within the European Commission's (EC) Directorate General (DG) for Education, which saw the promotion of economic development as a major goal of European educational policy (Cino-Pagliarello 2017). The Commission's strategy was to use the Open Method of Co-ordination (OMC) to persuade member countries to adopt common EU policies, including a particular conceptual framework to classify and compare vocational qualifications across Europe (Mehaut and Winch 2012).

Rather than the 'input' approach of earlier CEDEFOP attempts, this framework involved the 'products' of learning processes by classifying qualifications in terms of learning outcomes, seen as practically oriented, easily understood and serving as a basis for cross-European comparison. However, as Allais (2014) argues, learning outcomes are attractive as an instrument for putting education in the hands of the 'consumer' (employers) at the expense of the 'producer' (VET institutions). At the outset, cross-European research on VET transparency tools faced challenges of conceptual analysis, in particular interpreting what the EC and individual states understand by 'learning outcomes' and making sense of processes to establish the equivalence of qualifications at both European and national levels (Brockmann, Clarke, and Winch 2008).

There is no such thing as pure comparison; two or more things are always compared in respect of some property or other. The comparative studies discussed above used particular comparators to look at institutions or processes of convergence or divergence, including using the LME/CME contrast as an economically-based yardstick with the advantage that different aspects of two contrasting economic types could be teased out. When, however, a supranational institution with its own agenda is incorporated into a cross-national comparison, an economic criterion on its own is not enough. A finer-grained and interdisciplinary framework is needed to capture the different elements of like and unlikeness between countries in respect

of VET, going beyond a broad-brush differentiation of capitalisms and able to deal with national differences in detail, common supranational policies, conceptual complexity and linguistic diversity.

Such a comparative framework was applied to data gathering and analysis in our Nuffield study, concerning the take-up of EQF in four countries (England, Germany, France, Netherlands) (Brockmann et al. 2011). The economic aspect is partly captured through a labour market dimension, focused on national level characteristics and taking into account different emphases on qualifications and worker capability. A governance dimension encompasses the contrast between social partnership co-ordination and the market as well as the state's role in managing economic activity and VET provision, as also illustrated in the recent comparative survey of values underpinning VET governance systems by Markowitsch and Chan (*In press*). With VET as the focus of our study, another dimension concentrated on occupational ability or competence in the broadest sense, capturing the contrast between VET systems oriented towards learning outcomes (e.g. England) and those more knowledge-, content- or 'input'-based (e.g. Germany, France). This was critical to assessing the prospects for EQF, with its particular attachment to 'outputs'. Finally, since VET is an educational activity, an educational dimension captures the contrasts between education and training and between different academic levels. The study found important similarities between three of the countries in terms of educational orientation, competence conceptions and governance arrangements and significant differences between them and England, with its narrow conception of competence, flexible labour market, and emphasis on training rather than VET. The Bricklayer Project (Brockmann, Clarke, and Winch 2010), which adopted the same underlying methodology applied to eight countries, reinforced this English exceptionalism, whilst also pointing to a significantly different approach in all four dimensions for Italy, suggesting another axis of intra-European regional differentiation through the Mediterranean littoral.

A subsequent study of furniture making VET (Galla 2014) in seven EU countries, broadly using the same methodology, identified another intra-regional axis of differentiation in two groupings: north-west Europe, with a broad approach incorporating social partnership structures, and eastern Europe far less so. This project found, however, enough common elements for a common core curriculum to be viable within furniture-making VET, conceptualised within an EQF structure. Therefore, all these projects, using similar methodological assumptions, show the difficulty in imposing a uniform structure on diverse national VET systems as well as regional VET families, with further integration occurring through EU regulation and multinational operations. They suggest that with a sufficient number of key variables a comparative methodology captures some of the complexity of European developments and reveals elements of commonality within diversity. Above all, they show that the EQF requires more detailed work at sectoral and occupational levels to achieve relevance in the European labour market.

To compound difficulties of incorporating the European level into comparative VET research, from 2010 onwards, another EC directorate, DG Employment, Social Affairs and Inclusion, apparently independently of DG Education's EQF development, launched an EU-wide VET policy tool, ESCO, and in 2014 took over all EU VET initiatives, including EQF. Like EQF, the ESCO approach, designed to make the European labour market more responsive to employer needs, is outcome oriented and its main pillar is 'Skills', a collection of 13,485 skill descriptions (linked to occupational tasks) that can be composed into occupational profiles. 'Skills' are in effect descriptions of outcomes of whatever learning process led to their acquisition. There is also an Occupations Pillar, consisting of 2,942 occupations, plus a Qualifications Pillar, composed of brief descriptions of national occupations submitted by member countries. A key aim is to ensure that the classification is constantly updated through intelligence from member state sector skills organisations, supposedly facilitating rapid labour market response to technological, economic and social developments. ESCO's design is more closely related than is the EQF to the English National Vocational Qualification (NVQ), adopted in 1986 (Jessup, G 1991) and abandoned in 2016. Like NVQs, ESCO is designed with presumed employer needs in mind, whether or not these correspond with employers' real needs, and like EQF (but unlike NVQs) as a multinational labour market tool.

One danger with such an approach is that ESCO simply mirrors the skills of yesterday and is unable to envisage or encompass changes required, whether in the labour market or the VET system. In this regard, the VET for LEC project (Clarke et al. 2019; Clarke, Sahin-Dikmen, and Winch 2020) was designed to assess the ability of the European construction industry and its respective VET systems to respond to climate change by incorporating LEC elements into qualifications, occupational profiles and curricula. Like previous projects, the multi-dimensional comparative approach adopted focused on competences, governance, the labour market and education/training, with careful attention also paid to conceptual variation in understanding competences needed for successful NZEB. In spanning ten countries – from Scandinavia through north western Europe, the Mediterranean and Eastern Europe – VET for LEC provided ample scope for identifying intra-European convergence and divergence in adapting construction VET systems for NZEB. A key finding was that countries (notably Belgium and Germany) successful in meeting NZEB requirements place strong emphasis on relevant scientific and technical knowledge, attitudinal factors, and ability to work in a team and independently in problem solving and project management. Countries neglecting these aspects display little progress in implementing the Energy Performance of Buildings Directive (EPBD) through their VET systems.

How relevant were EU VET policy tools in pointing the way for member states to respond to the EPBD? Some evidence was found in Polish attempts to develop sectoral qualification frameworks, themselves a development of the

National Qualification Frameworks (NQFs) the EQF sought to bring about nationally. There was unsurprisingly no evidence of developmental effects from ESCO, given that its earlier mono-level classification of all occupational attributes as 'skills' failed to capture the hierarchical structure of qualifications so important to VET for LEC, which depends on integrated abilities and dispositions going beyond ESCO skills classifications. Indeed, ESCO's inability to do justice to longer term capacities multiply realisable in different skill sets, known in Germany as '*Fähigkeiten*' as opposed to 'skills' (*Fertigkeiten*) (Hanf 2011), led to attempts from 2018 to create a hierarchy of abilities and to differentiate skills, transversal skills, knowledge, attitudes and values (EC 2018b). However, ESCO cannot capture the integration of theoretical knowledge into occupational abilities, treating knowledge elements of occupational capacity trivially in simple descriptors independent of related occupational and transversal 'skills'. For example, the problem-solving ability (*Fähigkeit*) of an insulator is not transferable into electrical work, whilst the attitudes or '*savoir être*' so vital to the occupational profiles of, for instance, Belgian construction workers are hardly dealt with. Indeed, there is no evidence that ESCO plays a role in the construction labour market in relation to NZEB, belying its claim to facilitate new developments. ESCO is most obviously adapted to the employer-led, 'skill'-based approach exemplified by England in the Bricklayer Project (Brockmann, Clarke, and Winch 2010), but provides no guidance on constructing complex qualifications incorporating elements needed, whether for bricklaying, furniture making, or NZEB. In terms of governance too, ESCO disregards VET and labour market diversity, almost guaranteeing problems in application, including union resistance, and replicating earlier EQF attempts to impose a learning outcomes framework independent of the content of particular VET programmes that may not share this design framework.

Governance of the EU VET policy tools connotes, therefore, a weak to non-existent regulatory role for the EU and formal commitment to social partnership oriented towards employer rather than labour interests. This weak governance role can however have significant effects at national level through, for example, persuading EU states to adopt NQFs into which qualifications do not neatly fit (Emmenegger and Seitzl 2020). All in all, EU tools have therefore served to introduce another level into comparative VET research that, in the case of EQF, has helped compare different VET aspects across Europe, especially competences and their embedding in curricula and occupational and qualification profiles. However, their weaknesses, especially in terms of governance and failure to gain labour market currency, mean that this level of analysis sits on somewhat precarious foundations.

The four-dimensional framework outlined does nevertheless form a starting point for taking account of variations in labour market realities, governance, education in the broadest sense together with different conceptions of competence. It is capable of identifying VET 'families' within the EU, intra-national variations, for example between regulated and non-regulated occupations, and

last, but not least, introducing the EU as a VET 'player' and assessing its role *vis a vis* national systems.

Catching system dynamics in comparative VET research

As evident from above, comparative VET research has long been dedicated to developing sets of categories for grasping the most striking differences between systems and explaining these. As argued in this section, this line of research needs to expand to mapping the dynamics within VET systems, analysing its driving forces, and understanding how national VET systems respond to global challenges in, for instance, industrial relations or technology and whether they evoke converging or diverging effects.

An interesting observation in CEDEFOP's Scenario's for European Vocational Education and Training in the 21st Century publication (2020) is that, despite more than 40 years of European education policies, the trajectories of individual countries indicate a lack of fundamental change within VET and in the position of VET in national education and training systems; increasing numbers of apprenticeships have not, for instance, made the Hungarian VET system more like Germany. Instead of looking for explanations, one might wonder whether changes have not been detected because the analytical framework was inadequate for visualising detailed changes by only highlighting institutional changes or because of an exclusive focus on policy making initiatives. This raises the question of how national VET systems respond to comparable external challenges, such as the particular effects of education policies and of new technologies and ecological and environmental issues on employment structures? Now there is better knowledge of how national VET systems are organised and how they differ, it should surely be possible to analyse which systems are better equipped to respond to (rather similar) challenges?

Recent years have seen an outburst of debates, forecasts and reports on the implications of technological change for the future world of work, fuelled by studies suggesting that, while routine work may disappear at all occupational levels, the biggest impact will be the replacement of lower-skilled people by computers (Frey and Osborne 2013; Oesch 2013; Brynjolfsson and McAfee 2014). As the World Economic Forum (2020) summarised the situation:

- in ten years, 50% of jobs will be changed by automation – but only 5% eliminated;
- nine out of ten jobs will require digital skills;
- young, low-skilled and vulnerable people all need help with upskilling.

Already in 1991 Bengsston, in exploring relations between economic structures and the nature of work, concluded that, with the gradual evolvement of the service economy, multiple competences, including creativity and entrepreneurship, become key, replacing manual skills. This process, beginning in what is called the

third, or digital, revolution (Drucker 1966) accelerates with the introduction of new, more complex information technologies, like the internet of things and artificial intelligence (Ananiadou and Claro 2009), and is detailed in the OECD's (2019) 21st Century Skills and Competences programme. Apart from affecting employment structures and competence demands, technology affects employment relations as information and communication technologies make remote working possible for more people, a process accelerated with the 2020 Covid19 crisis, and the 'gig economy' threatens the stability of being tied to specific workplaces. In 28 out of 33 OECD countries where data are available, labour market insecurity rose between 2007 and 2015, exacerbated by the progress of artificial intelligence. Machines able to perform cognitive tasks are expected to become important in key sectors, such as healthcare and transport (OECD 2019).

From data from five West European countries, Oesch (2013) concludes that, although employment has expanded everywhere in business services and social services rather than in production occupations, menial services, or back office positions, this process is more manifest in some countries (Spain, Denmark, Germany) than others (Britain, Switzerland). Determinant of occupational change is not so much technology, but interactions between technology and the supply of skilled/qualified labour, the regulation of wage-setting and employment relations and (VET) education policies in terms of investments in occupational upgrading:

while technological advances increased firms' demands for qualified labour, educational expansion made sure that ever-larger shares of forthcoming cohorts had at least medium levels of qualifications. (Oesch 2013: 5-6)

In other words, technology does not have unambiguous and one-dimensional effects on VET in terms of improving or deteriorating labour market opportunities of young graduates, or of rendering the delivery of VET more uniform. Relations between the labour market and education systems are not so straightforward; whilst new technologies might affect the demand for skilled/qualified labour, VET's labour market currency in its turn affects the way labour is organised around new technologies. This was of course the focus of the groundbreaking 1980s CEREQ (Centre d'études et des recherches sur les qualifications) (1991) study and before that of Lutz's 'Das Ende des Technikdeterminismus' [The End of Technical Determinism] (Lutz 1987), though comparative analyses of interactions between technology and VET since have tended to be sketchy in drawing out the potential implications for VET systems.

Catching dynamics between and within VET Systems in comparative VET research

From an historic point of view, Bussemeyer and Trampusch (2012) identify four 'skill' formation systems, based on the degree of firm and state (public) involvement in the

provision of initial VET. Systems vary according to the role of such intermediary bodies as employers' associations and unions, the currency of qualification standards and the relevance of the workplace as a training location. Germany, the Netherlands, Denmark, Switzerland and Austria are seen as examples of a 'collective "skill formation" system', one of the four ideal typical systems. In particular, this collective system is under threat, and only partly due to country specific factors, such as falling membership weakening unions' position in validating VET qualifications. These systems are fragile in themselves, as institutional arrangements need permanent negotiation, being affected by the policies of both educational and economic stakeholders, and subsequently sensitive to conflicts of interests. This institutional fragility is evident in the more recent study by Durazzi and Geyer (2019), comparing the development of alternatives to the dual VET system in Germany and Austria, and attributing the differences identified, in effect the dynamic of change, to union strategies.

Within this category of countries, in times of profound labour market changes the co-design of national qualification systems, representing the link between the VET systems and the labour market, turns into an area of dispute in particular concerning the relevance of competences and validation procedures. While earlier debates focussed on whether processes of revising and updating qualifications could be accelerated (Westerhuis 2001), technology-inspired changes in job and occupational structures have evoked more fundamental issues, especially given that qualifications are the basis for the integration of young people into both an occupation and a company's social structure. For instance, qualification frameworks based on detailed sets of sector-based standard occupations, produced in time-consuming, multi-stakeholder consultation processes, as with the German and the Dutch ones, struggle to capture – from these frameworks' point of view – cross-sectoral changes in employment structures and underlying firm-specific job structures. This challenge has evoked different responses in both countries. In the 1990s the *communis opinio* was that a structural change in the institutional composition of the German dual system was needed as it could 'no longer cater to the requirements of companies in the process of developing and changing work organization, products, and work processes' (Spöttl and Windelband 2013). Its concept of vocational professionalism focused on practical and tacit knowledge and experience was seen as irrelevant to a service and knowledge society needing systematic theoretical knowledge, possibly the reason why growing numbers of graduates from bachelor programmes poured into the upper segment of the labour market previously held by dual system graduates (Baethge and Baethge-Kinsky 1998; Baethge and Wolters 2015; Spöttl and Windelband 2013). However, despite crisis scenarios, social partners and other stakeholders were successful in ensuring the effectiveness of the dual system and preserving vocational professionalism through a number of innovations, keeping the basic structures intact.

The Dutch VET qualification system underwent profound change in 2015 by rationalising the process of revising qualifications and the introduction of multi-sectoral qualifications, implying a decline in sector-based social partner involvement at national level and the introduction of multisectoral qualifications (Berkhout 2018). The subsequent introduction of optional modules and experiments with defining qualifications at regional level marks the transfer of VET policy power to regional stakeholders under the assumption that VET schools, operating locally, are in a better position to respond to changes in work organisation, products and work processes.

VET systems in the 'collective skill formation system' category in particular thus respond in dissimilar ways, dependant as they are on the outcomes of negotiation processes involving a variety of stakeholders; Germany's dual VET system reinvented itself, while the Netherlands saw a gradual and ongoing shift from national tripartite policy-making as the nucleus of decision making to the regional and school levels. In Germany as well as in the Netherlands solutions were sought to meet the diverse interests of individual companies within a national framework. However, whereas the Dutch solution tends to downgrade the regulatory power of national structures, the German one leaves national decision-making structures intact by making allowances to local diversities, perhaps attributable to a significant difference in the policy position of VET schools in both countries.

Within national VET systems, sectors respond differently to technological or labour market developments, as the example of the Netherlands shows. In 2020 half the Dutch population is highly educated (EQF 5+), a share set to rise and seen as beneficial to economic growth, which is fuelled by education (Goldin and Katz 2008), but on the downside devaluing the currency of VET diplomas in particular at lower levels. When the majority of the Dutch workforce is higher educated and the share of those with a lower level of education (EQF 1) drops, from 70% in 1965 to nearly 27% in 2009, the position of VET within educational and social hierarchies changes (Vermeulen 2019). However, as a metaphor for Dutch education policies, the concept of a race between technology and education risks overlooking sectoral differences in the response to educational and technological change. Though the highest level in the Dutch VET system (4) already attracts an absolute majority of students and the prognosis for 2030 is that in ten years almost two-thirds of all VET students will enrol on level 4 courses while level 2 will attract only a modest share of 12%, these figures are not representative for all sectors. Enrolment figures for construction VET follow the general trend, but there are significant differences. Compared to the current enrolment figures for VET level 2 in general (18% of enrolments), the share of construction VET students in level 2 courses is significantly higher (29%).

That the employment structure in the Dutch construction industry lags behind other sectors in its share of higher skilled workers (Level 4) is commonly explained by the sector's poor innovation record (De Bruijn et al. 2005), deduced for instance from the limited use of Building Information Modelling (BIM),

deployed intensively by only 10% of all Dutch construction firms and only at beginning stage by 70% of those with over 100 employees (EIB 2019). Although the need for innovation is recognised in the light of the major social challenges – such as increasing urbanisation, variable housing needs, climate change and sustainable energy (Arnoldussen et al. 2017) – the project-based nature of construction work, involving temporary coalitions and requirements to deliver to pre-defined detailed prescripts and government regulations, are identified as particular structural obstacles (De Bruijn et al. 2005; Arnoldussen et al. 2017). The search for qualified workers elsewhere implies acceptance of this situation, as well as the increasingly limited role of VET in providing for the sector's workforce; according to EIB (2019) 2020–2023 forecast, 10% of site workers need to be recruited from abroad and 25% from other sectors instead of from the VET system.

The variety and staging of sectoral responses to labour process and technological changes within countries challenge comparative VET research methodologies, as do the interactions between economic changes and VET within clusters of comparable VET systems. As situational path dependencies have a significant impact on the dynamics of VET systems, the question of how to research the changing nature of systems can only be captured within a multidimensional and multi-level approach.

Conclusions

There are formidable challenges in researching a multinational set of diverse but interlocking VET systems, in themselves disparate and loosely held together by a weak supranational framework and a single labour market. Nevertheless, if European VET systems are set in the wider context of education, which through, for instance, student mobility and Erasmus programmes includes VET participants, the picture looks different and they have a potentially more solid European foundation. This is certainly the case with the labour market dimension, such as for construction, which through freedom of movement of labour and services and through European procurement processes has gained a firm European-wide footing, sometimes with profound and not always welcome consequences for national labour markets. The specialisation of firms in, for instance tunnelling, roof insulation, or solar panel installation, has also opened up training centres for the existing workforce on a European-wide basis, given the investment and trainee capacity required.

Comparative VET research has been enriched by this European dimension, moving away from simply comparing different typologies on a country to country basis. Yet disparities within and not just between VET systems cannot be ignored by comparative research, particularly given considerable social and technological changes. A further challenge in analysing VET systems is how to handle the dynamics within labour markets, governance systems, the educational domain and conceptions of competence in for instance VET and higher education. We

argue that comparative VET research, in identifying the dynamics within the four dimensions at different levels and analysing how VET responds to these, shows how such a methodology can cope with a rapidly changing environment, and in doing so helps us to deepen our understanding of how – and why – VET systems change. Comparative VET research should not limit itself to the domain of national and institutional differences from a synchronic perspective, but move on to the domain of understanding disparities and the drivers of change.

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