THE WILEY HANDBOOK OF
VOCATIONAL EDUCATION AND TRAINING

DAVID GUILE AND LORNA UNWIN

WILEY Blackwell

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Edited by David Guile and Lorna Unwin

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Compiling a Handbook of this size and scope necessarily takes time and depends for its quality on the willingness of very busy scholars to accept the invitation to participate. We would like to express our thanks to all the contributors to this Handbook for their generosity and patience. We also want to thank our Project Editor at Wiley, Janani Govindankutty, for her encouragement and advice.

1

Introduction to the Handbook: Vocational Education and Training (VET) Theory, Practice, and Policy for a Complex Field of Inquiry

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From creating and repairing the first artifacts for personal and communal use through to the Internet of Things, the capacity of human beings to transform the world around them, for better or worse, continues to be shaped by their participation in social practices and learning, collectively and individually. Developing the expertise required to participate in work-related activities engages people in diverse forms of learning in a wide range of spaces throughout their lives. These spaces include workplaces, workshops, classrooms, community and domestic spaces (including forms of transport), and the natural environment, and increasingly through interaction with digital technologies, including the Internet. For some people, the expertise they deploy for what they term *work* (whether paid or unpaid) may be very different from the expertise they deploy in their leisure time, whereas for others there may be a close connection.

Regardless of what drives an individual or a group of people to develop expertise, they will at some point participate in vocational education and training (VET). This participation will range across a wide spectrum: from programs providing an initial introduction for school pupils, to what is sometimes naively referred to as "the world of work," through to bespoke training organized by or for employers and self-taught activity. In this way, VET embraces programs using work as their pretext, although treating it as a largely generic or abstract construct; programs that have a specific occupational focus and may lead to a license to practice; apprenticeships that combine education and training both in and away from the workplace; and work-based learning of various types and duration triggered by changes and innovation in work processes. As a result, the relationship between VET and actual work practice varies considerably. VET is a complex and challenging field of inquiry precisely because it cannot be easily defined.

By starting our introduction to this book with a deliberately unbounded perspective on VET, we want to signal the importance of viewing this field of

inquiry through a lens that is wide enough to capture both the "systems" approach and the theories, practices, and ideas that lie outside it. Indeed, the very acronym *VET* is problematic because it immediately suggests this Handbook is confined to analyses of different national systems for organizing formalized, regulated, and often government-funded VET programs. Even more limiting, the acronym is often exclusively applied to education and training for young people as they make the transition from school to the labor market. In this way, VET becomes situated in a policy silo separated from, and sometimes deemed inferior to, so-called academic education. Understanding the differences between the ways that countries have conceptualized VET over time and created the institutions, curricula, and pedagogies they regard as appropriate sheds valuable critical light on how VET is evolving (see, inter alia, Michelsen & Stenström, 2018). It can also identify effective practices and processes that can be shared across countries and occupational fields. In addition, as an instrument of government policy or an institution within a national system of education, VET becomes answerable to important questions about social justice (e.g., unequal patterns of access and outcomes according to gender, ethnicity, and social class). Heikkinen (2001) offers two compelling arguments for the continued importance of national case studies in VET research. First, they "may challenge the dominant a-historical discourse in vocational education, which only advocates permanent change, its inevitability and progressivity"; and, second, historical, state-based perspectives can paradoxically contribute a "progressive conservatism" in relation to defending, respecting, and caring for longstanding practices (Heikkinen, 2001, p. 228).

There is a balance to be struck so that VET is not solely regarded as an instrument of government policy and/or an institutional component of a country's broader education system. Equal weight needs to be given to the conception of VET as a relational concept, which forms part of a dynamic interplay with the evolving organization and process of work, including the emergence of new occupations. The dominance of the systems-based approach has meant that in much of the international research literature on education, VET has been separated from and positioned below "higher education" and "professional education," despite their association with the development of expertise. This segmentation is perpetuated in policy documents issued by national governments and supranational agencies such as the Organisation for Economic Co-operation and Development (OECD), World Bank, and European Commission.

In recent years, a number of studies have acknowledged the related nature of a range of challenges, including the ethical and practical implications of climate change for continued industrialization and economic growth, the impact of digital technologies on employment, the work and health concerns of aging populations, the challenges facing young people entering and making progress in the labor market, and continuing inequality across the global economy (see, inter alia, King, 2017; Olsen, 2009; Piketty, 2013; Standing, 2011). Placing equal emphasis on both continuing and initial forms of VET is being advocated as a necessary strategy to ensure people can adapt and refresh their expertise at different points in their lives in order to respond to changes in the labor market (see, inter alia, Bohlinger, Haake, Jorgensen, Toiviainen, & Wall, 2015; Field, Burke, & Cooper, 2013; Pilz, 2017). The predictions of the *hourglass thesis* that

the growth in employment in advanced economies would increasingly occur at the top and bottom ends of the labor market have materialized to some extent in relation to Goos and Manning's (2007) polarization of employment into "lovely" and "lousy" jobs, with a corresponding squeeze in what are classed as "intermediate" jobs. Yet there is also evidence that this thesis is problematic in relation to its classification of jobs according to (a) definitions of skill based on educational entry requirements, rather than on the actual range of skills required and used in the workplace; and (b) wage distributions. Lerman (2017) asks, "Are the skills required for a master carpenter in some sense *lower* than those required of elementary school teachers with BA degrees?" (p. 182; emphasis in original). In addition, he explains that the wage measure does not capture the wide distribution and overlapping of wages within occupations. On these grounds, the predicted decline in what are classified as intermediate-level jobs and the homogeneity of the terms *lovely jobs* and *lousy jobs* become less reliable guides to the changing nature of work.

In some occupational fields, including high-status areas such as medicine and engineering, as well as in some service sectors, a more fluid division of labor is emerging. This has been stimulated partly by increasing project-based and team-based forms of working and also by the realization in work-intensive environments that demarcations based on traditional hierarchies of who is "qualified" to perform certain tasks can and need to be challenged. This has resulted in some countries renaming VET, for example by (re)using the term *technical education*, and in the opening up of access for VET students to universities through the strengthening of VET qualifications and the creation of so-called *higher apprenticeships*. There has also been a continuing debate about the concept and role of so-called key competences in VET, and in education and training more broadly (alternative terms include *generic, core*, and *transferable skills*). Researchers have expressed mixed views as to whether they represent "an ineffective surrogate for general education and culture in vocational programmes" (Green, 1998, p. 23) or work in progress (Canning, 2007).

The European Commission (2018) has declared that lifelong learning should impart eight key competences, which "can be applied in many different contexts and in a variety of combinations" deemed necessary for a "successful life" (p. 14). These competences cover literacy; languages; mathematics, science, technology, and engineering; digital competence; personal, social, and learning competence; civic competence; entrepreneurship competence; and cultural awareness and expression. The latter four categories of competence in this list are sometimes referred to as "soft" skills. Warhurst, Tilly, and Gatta (2017) argue their emergence reflects a longstanding shift toward a "social construction of skill" led by the rise of service sector employment.

The OECD has enshrined the notion that work-related cognitive and noncognitive competencies can be decontextualized and formally tested at an international level in its Programme for the International Assessment of Adult Competencies (PIAAC). PIAAC assesses the proficiency of 16–65-year-olds in literacy, numeracy, and problem solving, which the OECD (2016) argues are the "key information-processing skills" that adults need to participate fully in all aspects of life in the twenty-first century (p. 22). Scholars who have critiqued

PIAAC and other international large-scale assessments such as PISA (Programme for International Student Assessment) raise a number of concerns about the universalizing tendency of the OECD's interpretation of the concepts of competence and, more broadly, education (see, inter alia, Addey, Sellar, Steiner-Khamsi, Lingard, & Verger, 2017; Avis, 2012; Hamilton, 2012; Lingard & Sellar, 2013; Takayama, 2013). Another problem is that the PIACC approach perpetuates the idea that learners automatically apply the skills they have developed in education in work contexts. This assumption overlooks processes through which skill is formed and developed contextually and, moreover, that when the organization of work changes, so do considerations about skill. Despite these concerns, the findings from the OECD's assessment surveys and the subsequent performance ranking of countries are exerting considerable influence on national governments. There has also been an attempt to develop an international assessment survey for VET (Achtenhagen & Winther, 2014).

Developments such as the renaming of VET, the inclusion in VET curricula of key competencies, or attempts to align VET with higher education are often transitory for a range of conceptual, political, and context-specific reasons. They are usually well intentioned, but often fail to engage in a sustainable way with the underlying challenge—how to support the development of expertise in ways that are both sustainable and flexible enough to adapt to changing circumstances. Although there are significant continuities in the way work is organized and the way certain skills are developed, the division of labor is in a continual state of development in response to the forms of technological, economic, and cultural change associated with the rapid development of cognitive technologies and the digital linking of communication, resources, and logistics. As a result, the process of developing expertise in this new work context will create new patterns of and approaches to learning.

There is a substantial international research literature covering the diverse and contested field of VET. This literature has emerged from different disciplinary fields and occupational contexts, and reflects a wide variety of conceptual and methodological approaches. As a result, it is scattered across journals and books, which attract their own readerships. Much of the literature reflects a westernized perspective, and so what counts as and is discussed in relation to vocational expertise, vocational learning, and occupational contexts is necessarily circumscribed (Catts, Falk, & Wallace, 2011; Heikkinen & Lassnigg, 2015). However, it is striking that one of the most influential theoretical developments in the field of VET—situated learning within communities of practice—emerged from anthropological studies of craft apprenticeships in West Africa (Lave & Wenger, 1991). This contribution critiqued the dominant cognitivist conception of learning in which individuals were seen as passive receivers of (codified) knowledge from designated experts (teachers and trainers). Lave and Wenger (1991), however, introduced the idea that learning was a social process. They placed the apprentice as a learner at the center of a relational process that was shaped by participation in occupational practice and contributed to the reshaping of occupational contexts. In doing so, they opened the eyes of VET researchers (and researchers in fields, such as economic geography, human resource

development [HRD], and organizational learning) to other theories of learning or practice-based theories that imply a social theory of learning. We return to this observation later. Situated learning theory has itself been critiqued, particularly for underplaying the in-built conservatism of and power relations within communities, for the role of experts in challenging existing practice, and for valorizing participation at the expense of questioning what is being learned (see, for detailed reviews, Fuller, Hodkinson, Hodkinson, & Unwin, 2005; Guile, 2010; Hughes, Jewson, & Unwin, 2007).

This questioning of the nature of learning in the field of VET reflects the desire to conceptualize and gather empirical data identifying the dynamic nature of the ways in which expertise is developed, utilized, and reformed. Moreover, it demonstrates a fundamental dissatisfaction with attempts to align VET too closely with learning theories that continue to underpin the way (formal) general education is still organized in much of the world, or to reduce the complexity of learning associated with VET to rhetorical notions, such as "learning from experience" or "learning by doing" (Unwin et al., 2008).

There are multiple demands on VET. These include meeting the skills needs of employers and nation states, addressing concerns about providing a safety net for young people at risk of unemployment, and offering a vehicle for remedial education for young people and adults. Winch (2000) argues that "a prime aim of vocational education is personal development and fulfillment through work for all citizens if they so wish it" (p. 36; see also Gonon, 2009; Tyson, 2016). The more VET is required to fulfill and sustain the role of general education beyond formal schooling, the further it drifts away from the very source that ensures it can remain vital in people's lives and sustain the socioeconomic and cultural well-being of society. VET and work form a symbiotic relationship. This means that VET can certainly provide the means for individuals to critique the nature of work at the same time as the means for individuals to shape work.

In recent years, there has been an increasing interest and growth in multidisciplinary research, and this has encouraged scholars to cross intellectual boundaries in an attempt to develop more integrated analyses of the complex and dynamic field of VET. This research feeds into a number of different debates about the role of VET in the education systems of nation states and in relation to rapid changes (and often neglected continuities) in workplace technologies and work organization. These debates are multifaceted. Sometimes, they have a speculative dimension with contributors arguing for fresh thinking about the concept of VET or subsidiary concepts that underpin VET (i.e., occupation). Sometimes, they have an avowedly critical stance vis-à-vis developments that contributors believe have a negative impact on VET, especially when those developments have been associated with what are regarded as flawed government initiatives to make VET ever more relevant to employers and learners.

In contrast, there has been a longstanding debate about the political economy of VET. Traditionally, this debate (in fields such as political economy, labor process, and industrial sociology) focused on the variety of historical, economic, social, and political forces that have shaped the dominant human capital conception of VET in different countries. This debate has, however, branched

out in new ways in recent years as contributors have drawn inspiration from developments in political economy, for example *varieties of capitalism* and *skills ecosystems*, or from extant literatures that offer alternatives to *human capital theory* (HCT), such as in the *capabilities approach*, to rethink how to support the economic needs of individuals, employers, and nation states. Both debates have different degrees of influence on the modifications or changes that have occurred in the different national arrangements for VET, for example revisions to "systems" in response to technological change and increased amounts of general education in relation to concerns about citizenship.

The aim of this Handbook, therefore, is to provide a critical guide to the different ways in which VET has been and continues to be (re)conceptualized and (re)configured over time. To that end, we commissioned scholars working from different theoretical perspectives to write essays exploring a set of key themes that are central to debates about how the concept and practice of VET have developed over time and continue to develop in different ways both across and within countries.

Structure of the Book

We have structured the book around five broad themes:

- VET as an evolving concept
- The political economy of VET
- Arrangements for VET
- Developing practices in VET
- Challenges for VET.

Using these themes provided us with a framework for assembling a Handbook with the necessary intellectual and empirical scope to consider the following questions:

1) Which theories and concepts can help us to understand the meaning of VET as a vehicle for the development of expertise, and how is that meaning evolving over time?
2) How have those theories and concepts contributed to the different ways in which VET is manifested around the world?
3) What is the relationship between VET and the political economy imperatives that drive policymaking in different countries, and what are the consequences for individuals, employers, and society at large?
4) How does VET develop expertise in an age of considerable change in work processes, work organization, and occupational identities; and how might it maintain a close relationship with work in general?
5) How might we characterize the different models of learning used in VET, and to what extent do they reflect VET's troubled relationship with general education?
6) What characterizes VET pedagogy, curriculum design, and approaches to learning?
7) What are the continuing challenges for VET?

These themes and questions necessarily overlap. Given our earlier plea for the need to take a more eclectic perspective when researching and discussing VET, it could be argued that we are contradicting ourselves by using a segmented approach. Our defense would be that the complexity of the VET landscape, both conceptually and internationally, means some clustering of the chapters is required. However, we are fully aware that other configurations may have been equally valid.

VET as an Evolving Concept

The five chapters in Part I explore some of the underlying theories and concepts that help to explain how VET continues to evolve in different ways both within and across national boundaries. As editors, we begin this process (Chapter 2) with a chapter that argues for a *prospective* expertise-based approach to VET in contrast to the existing skills-based *retrospective* approach, which has come to dominate VET research and policymaking. The chapter draws on sociocultural theories of learning and insights from communication studies. Through a discussion of the impact of IT platforms, artificial intelligence, and the increasing economic importance of "intangible assets" on work processes and conceptions of expertise, we show how a close relationship to future work practice is vital to ensure VET can sustain its important role in the development of expertise.

Drawing on the work of the American philosopher John Dewey (1916), Stephen Billett uses the distinction between the "social" and "personal" to discuss how the origins and purposes of VET emerged and changed across countries. His essay (Chapter 3) argues that although VET is always shaped by institutional factors, the individual learner has to be placed at the center of our deliberations in order to understand the efficacy and continuity of VET through the individual's engagement with the "intended," "enacted," and "experienced" curriculum. He also follows Dewey and argues that individuals first choose an "occupation," which then becomes their "vocation," but adds that it is an individual's "personal bases" that act to sustain and transform their capacities across working life.

Accepting that the concept of occupation is central to theoretical understandings of VET, the next two chapters focus on the way VET reflects the occupational structures in societies. Paul Hager (Chapter 4) explores how, as a result of industrialization and the growth of specialist occupations as well as more narrowly conceived job roles, VET began to cater to occupational levels both above the traditional apprenticeship level and below it. Classroom-based VET expanded, but the growth of HRD also meant that VET could contribute to the growth of short-cycle training within workplaces. Hager argues that these shifts over time have raised profound questions about how occupational expertise is developed and supported. In doing so, he provides a critique of the concept of competence-based training and increasing privatization of VET. His concern is to reconnect VET with more holistic understandings of competence that better reflect highly skilled occupational performance. Alison Fuller (Chapter 5) also sets her discussion in the context of occupational change. She argues that in the context of the shift to mass higher education in many countries, publicly funded VET (including apprenticeship) needs to generate hybrid benefits to ensure it

can be an effective vehicle for the achievement of occupational expertise and educational progression.

These chapters raise questions, therefore, about the conceptualization of the processes and outcomes of VET and how and whether they can be nurtured and sustained. As Hager discusses, over the past 30 or so years, a competence-based approach has been introduced in some national VET systems and is being advocated by policymakers internationally, although the interpretation of the term *competence* is highly contested (see, inter alia, Brockmann, Clarke, & Winch, 2011; Mulder, 2017) in the research literature. Leesa Wheelahan (Chapter 6) continues Hager's theme with a critical analysis of the concept of competence, based on the sociology of Basil Bernstein. Wheelahan argues that VET learners must be given access to the predetermined disciplinary knowledge they need to participate in debates and controversies in society and in their occupational field of practice. In doing so, she moves the discussion of the purpose of a (formal) VET curriculum away from its relationship with occupational formation and toward the type of knowledge she argues should be included in such a curriculum. This debate is further pursued in Part III of this Handbook, where authors explore the role of general education in VET programs for young people. Vocational knowledge is, however, a multifaceted, dynamic, and life-wide concept. It is explored further in Chapters 18 and 20, and by Broad and Lahiff in Chapter 22.

The Political Economy of VET

As we noted earlier in this chapter, varying forms of and approaches to VET have evolved over time across the world. This variety reflects historical, economic, social, and political forces. Given VET's close relationship with the economic needs of individuals, employers, and nation states, it is not surprising that it has become a subject of inquiry in the fields of political economy, labor process, and industrial sociology. In Part II, four chapters draw on a range of theoretical and conceptual tools to examine different aspects related to the political economy of VET. A fifth chapter provides a case study from Singapore of the impact on a specific group of low-grade workers of that country's attempt to introduce a national skills policy. Damian Oliver, Serena Yu, and John Buchanan (Chapter 7) begin Part II with a critical review of various political economy approaches, including HCT, in order to better understand the role of and challenges for VET in changing socioeconomic circumstances. They offer an alternative framework for understanding employer behavior and human development in relation to VET, drawing on (neo)institutional theories, in particular the skills ecosystem approach and the capabilities approach. Busemeyer and Trampusch (Chapter 8) then provide a critical review of the major concepts and findings from the comparative political economy literature, including the Varieties of Capitalism approach; the politics of VET; and the development of different types of skill formation systems. They discuss the increasing and significant challenge of labor migration for policymaking. Their chapter reminds us of the central, but often overlooked, role of the political decision-making processes in vocational training (VT) policies, including party politics and policy legacies.

Mark Stuart (Chapter 9) continues the discussion about employer behavior and policymakers' increasing attempts to improve productivity with a discussion focused on the connections between training and development and industrial relations. His chapter examines the conceptual underpinnings of the industrial relations of training, and argues that the struggle to achieve "mutual gains" for the social partners involved is becoming more and more challenging for all countries. The impact of the international financial crisis of 2008, including high youth unemployment rates, continues to be felt within many countries. Many governments are seeking ways to encourage more employers to support work-based VET. As a consequence, greater attention is being paid to the measurement of VET performance in the economic literature. Samuel Muehlemann (Chapter 10) reviews, from a business perspective, the theoretical approaches to and types of datasets required for measuring the costs and benefits of investing in training and how they relate to employers' decisions to engage in VET-related activities. He argues that a more dynamic perspective is required to capture the long-term effects of continuing VET as opposed to the current tendency to measure short-term performance in employees' current job roles. Soon-Joo Gog (Chapter 11) concludes this part with a critique of Singapore's concept of the "developmental state." This highlights the considerable challenges all governments face in making continuing VET accessible for adults through the life-course. She illustrates her argument with a case study of workers in the Singapore private security services industry. This challenges the supply-side focus of Singapore's national skills strategy and rhetoric of inclusiveness, which fail to tackle structural problems in the labor market and workplace.

Arrangements for VET

As we noted earlier in this chapter, VET is often associated with particular national systems of education and training, yet there are arrangements for VET that cut across those systems and, hence, give VET a universality that is often overlooked in the research literature. In Part III, six chapters approach this theme from a range of theoretical and methodological perspectives. Within all these chapters and across the Handbook more generally, readers will find references to specific arrangements regarding the design of VET curricula, approaches to pedagogy and assessment, and the involvement of stakeholders in the architecture of national systems. Brian Durham and Debra Bragg (Chapter 12) begin Part III with an essay that places the evolution of VET in the United States in historical context to explain the shift to what is now known as career and technical education. They discuss the legislative struggles to establish VET within the public-funded education system and the continued demands from citizens for access to a form of learning that is now outperforming general education in relation to employment prospects and wage premia. Alison Taylor (Chapter 13) also deploys a historical framework to trace the development of vocational education in Canadian secondary schools from the late 1800s to the present. She discusses how concerns about meeting the needs of an industrializing economy gave rise to technical and vocational education programs at the start of the twentieth century that were recognized to be class-specific and class-defining. In contrast,

the turn of the twenty-first century, with its shift from a manufacturing-based to a service-based economy and associated focus on the needs of a so-called knowledge economy, has led to a renewed focus on the potential of a unified curriculum to break down the division between academic and vocational learning.

VET's relationship to general education continues to be the subject of debate in research, policy, and practice in many countries. Vibe Aarkrog (Chapter 14) discusses how this debate necessarily involves developing an understanding about the functions of general education (including, for example, to provide a platform for further progression in education and work and for citizenship) as well as the pedagogical principles that might support a better interrelation between VET and general education. She illustrates her essay with a review of the various reforms to VET in Denmark, and the implications for teacher training when the proportion of general education in VET is increased, as many teachers are required to develop practice-based pedagogies. The *dual-system approach* used in Germany, Switzerland, and Austria has long been internationally regarded as a highly effective model of VET, yet it too has been coming under pressure: (a) in terms of the reduction in the number of employers willing to recruit apprentices; and (b) in the light of demands for the further expansion of higher education. Thomas Deissinger (Chapter 15) examines how the dual system, with its combination of part-time vocational and general education and workplace learning, is responding to the challenge of a drift toward academization, even though the model is still valued as providing a highly effective transition pathway to the labor market for school leavers.

Remaining in the context of the dual system, Matthias Pilz and Bärbel Fürstenau (Chapter 16) explore the concepts of duality and "learning fields" in relation to VET pedagogy, curriculum, and assessment. In doing so, they highlight the key challenges that are of relevance to not only Germany but also other countries. These include the relationship between theory and practice, the shift away from a subject-led approach, the implications for curriculum development and teaching and learning processes of using different locations, and the use of technology in VET assessment. As this chapter shows, the demands on VET teachers and trainers are considerable, yet surprisingly, they have been overlooked in the research literature. Kevin Orr (Chapter 17) reviews the literature that does focus on teachers and trainers and is able to show that, although national VET systems vary greatly, common themes emerge, including the experiences of change in those systems and continued weak social status. He argues that the position and role of VET teachers and trainers are best understood regarding how they relate to society and the economy and how those relationships determine their professional autonomy.

VET as a Developing Practice

We noted in this chapter that Lave and Wenger's (1991) argument that learning is a social process had exercised a direct and indirect influence on VET researchers: in the case of the former, leading researchers to draw explicitly on their theory or alternative social theories of learning, for example cultural-historical activity theory (CHAT), to investigate different aspects of VET-related learning; and, in the

case of the latter, alerting them to the value of practice-based theories or concepts, for example actor–network theory and epistemic objects, as resources for exploring learning in VET. The five chapters addressing different innovations in VET in Part IV exemplify that continuing influence in different ways.

Arthur Bakker and Sanne Akkerman (Chapter 18) argue that what is distinctive about vocational curricula, and by extension vocational knowledge, is that it comprises a course of learning across different school- and work-based practices. Elaborating and extending work originally undertaken in CHAT (Tuomi-Gröhn & Engeström, 2003), they conceptualize the practice of moving between school-based and workplace-based forms of VET learning as a boundary-crossing process. Bakker and Akkerman argue that the sociocultural differences inherent in these settings lead to discontinuity in action and interaction, which are portrayed in the literature and in policy documents as problematic. They challenge that view by showing how the use of boundary analyses might lead to a more fruitful means for addressing the much-discussed theory–practice gap in VET and, thus, assist learners to begin to develop their vocational or practice-based knowledge. Carmela Aprea and Alberto Cattaneo (Chapter 19) continue the theme of boundary crossing with an analysis of how digital technologies can be used to effectively support learning and teaching processes in VET, including in the context of simulations, which play a significant role in VET programs in a range of occupational fields. They discuss the potential and affordances of technologies as a means to connect different learning locations and provide a set of examples of prototypical uses of several technologies as boundary-crossing tools. In doing so, Aprea and Cattaneo remind us that learning technologies are doubly embedded (a) in their context-of-use, and (b) in the assumptions that VET practitioners make about learning. As such, both influence the way technology is deployed to support the process and outcome of boundary crossing.

Part IV then turns to two models of VET, which are derived from work practice and have a clear future-oriented perspective. Monika Nerland and Crina Damşa (Chapter 20) conceptualize VET as a lifelong process that encompasses educational and work-related activities. They employ the concepts of epistemic objects and practices as analytical lenses to show how students and professional practitioners in the field of software engineering in Norway access knowledge resources, explore and construct knowledge, and pursue learning opportunities as part of problem-solving and boundary-crossing activities. They argue that models for professional development should be reconsidered in recognizing the role that self-initiated learning plays for newcomers and professionals alike, especially since professional networks increasingly offer a rich array of resources to support the development of practice-based knowledge. Aimée Hoeve, Wietske Kuijer-Siebelink, and Loek Nieuwenhuis (Chapter 21) are concerned with the challenge of increasing the responsiveness of VET, which they define as its ability to interpret socioeconomic and technological developments in the context of curriculum design and pedagogy. They draw on case study research in the Netherlands in the context of work-based learning in higher professional education (HPE), where the challenge is to enable HPE to build regional networks and participate in regional innovation. Thus, they implicitly echo, although with a different lexicon, Oliver, Yu, and Buchanan's (Chapter 7) argument about the

importance of developing regional skills ecosystems, and they anticipate some of the ideas contained by Laura James (Chapter 27) and discussed in the "Challenges for VET" section of this chapter.

We end Part IV by returning to vocational teachers. In their chapter, Janet Hamilton Broad and Ann Lahiff (Chapter 22) explore how vocational teachers' expertise is used, developed, and sustained (over time) in practice. They argue that this is a complex, diffuse, and largely hidden process, residing either within the individual as personal expertise and/or within networks as shared vocational knowledge. They employ two different but complementary research methodologies (CHAT and actor–network theory) as analytical lenses to explore and make visible the phenomenon of vocational practice in action.

Challenges for VET

Part V of the Handbook provides four perspectives on the ways in which VET currently interacts with socioeconomic, cultural, and political continuities and change, and one perspective that adopts a prospective view of VET as an enabler of regional regeneration. As we noted earlier in this chapter, VET is often seen as the solution to both social and economic problems and judged accordingly. Karen Evans (Chapter 23) discusses how the social processes associated with gender, ethnicity, and social class are manifested in VET and how they are mediated by the structural, cultural, institutional, and labor market formations in which they are embedded. She argues that understanding how VET constitutes part of the problem as well as the potential solution should lead to a more realistic appraisal of the scope for VET to make a difference.

Part V then continues with three chapters focusing on the role of VET in India, China, and Argentina. All three countries face acute challenges in relation to ensuring their large populations are equipped with the expertise necessary to achieve the social and economic goals they have set. Tara Nayana and Sanath Kumar (Chapter 24) examine these challenges in the context of India, where the aim is to create a vibrant interface between VET and the needs of industry in order to achieve a competitive advantage at the international level. Zhiqun Zhao and Yunbo Liu (Chapter 25) write from the context of China, which has entered a new stage of economic transformation and, as a result, has attached renewed importance to VET. The number of vocational education institutions and students is rising rapidly, creating major challenges in relation to the administration of VET, the allocation of funds, and teaching and learning. Claudia Jacinto (Chapter 26) analyzes developments in what is termed *vocational training* (VT) in Argentina. She argues that VT does not comprise a harmonious, integrated system, but a complex set of public and private actions responding to different demands and segments of the labor market.

Part V finishes with an exploration of theories and concepts from the field of economic geography and their implications for VET. Laura James (Chapter 27) sets her discussion in the context of an emerging debate about the importance of linking policies for innovation and regional economic development to policies for VET. Her chapter therefore offers a complementary perspective to that of Hoeve, Kuijer-Siebelink, and Nieuwenhuis (Chapter 21). James focuses on the

key concept of learning regions. Using a practice-based perspective, she shows how VET research might forge a fruitful relationship with disciplinary fields with common, but often unacknowledged, cognate interests. This could further encourage the necessary connections that need to be made between diverse theories, policies, and practices in ways to enable geographical regions to actively shape their futures.

Toward a Prospective VET Research Agenda

This Handbook cannot and does not claim to be comprehensive in its scope, but rather to present a collection of authoritative essays on VET by leading and emerging international scholars. The detailed nature of the essays means that readers are provided with a wealth of references to other significant research and policy literature that it has not been possible to include in this volume. The essays reveal the richness of VET as a contested and evolving field of intellectual inquiry and its continued importance across the world. They also reflect differing ways to conceptualize, analyze, and evaluate the purposes, practices, and outcomes of VET. The five parts offer a mix of theoretical, policy, and practice-based insights into VET as an evolving concept; the political economy of VET; arrangements for and innovations in VET; as well as some of the challenges facing VET. We nevertheless acknowledge that it has not been possible given the scope of this volume to provide an internationally comprehensive collection. Key omissions include perspectives from African and Middle Eastern countries. This is partly in the case of the former because, as McGrath (2012) notes, "Whilst there have continued to be both policy and academic developments in VET in OECD countries; in the South there has been a paucity of VET research and little in the way of theoretical exploration" (p. 623). The Handbook is written in English, and most of the research cited in the chapters has been published in English. This necessarily begs the question as to how much valuable research remains untapped.

We hope, however, that many of the arguments and proposals found in this Handbook will cross international boundaries and resonate with researchers, students, VET practitioners, employers, and policymakers. A key argument is that VET is multifaceted, multidimensional, and context-specific. Successful features found in one context are not necessarily replicable nor should be conceived of as being replicable or scalable in another context. Another is that VET supports entry into and sustains people's capacity for working in a diversity of "combinational" or "layered" economies, in other words, economies characterized by both continuity and change. These economies cover traditional and niche-craft work, mass and diversified production and services, and co- and social production. In all, recent technological developments exist alongside earlier developments, and people cross boundaries in ways that are not captured by many of the classification systems used to describe and measure work practice. A further message is that policymakers need to be very cautious about positioning and then judging VET as the solution to social and/or economic problems. Doing so downplays the considerable contribution VET makes in

many countries and further renders invisible the understanding that the development of expertise is developed through a relational and dynamic interplay of a range of factors.

One of the goals of the Handbook has been to open up the field of VET research in three key ways. First, the Handbook explores the evolving and diverse character of VET within and across a range of contexts in an attempt to overcome the siloization we commented on earlier. Second, it encourages VET researchers to revisit and take a fresh look at the relationship between VET and work in the light of advances in digitization, new forms of work process, and the disruption of occupational boundaries. Third, it draws on the insights of scholars working in a range of disciplinary fields whose research tends to be published outside the mainstream VET journals. We hope that the collective insights provided throughout this Handbook will assist researchers, policymakers, and practitioners to develop what we referred to earlier in this chapter as a "prospective" approach to VET (which we discuss in detail in Chapter 2). This is in line with Heikkinen's (2001, p. 228) caution against the tendency in VET to either continually reaffirm the validity of an ahistorical discourse, which advocates permanent change, or describe and defend state-based perspectives. This shift in focus will hopefully lead to a new balance being struck where VET is understood, first, as a relational concept that forms part of a dynamic interplay with the evolving organization and process of work, including the emergence of new occupations; and, second, as an instrument of government policy and/or an institutional component of a country's broader education system to support the above vision. The first step toward realizing this vision, as we argue in Chapter 2, may involve replacing the concept of "skill" with the concept of "expertise" in VET research, practice, and policy.

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Part I

VET as an Evolving Concept

2

VET, Expertise, and Work: Situating the Challenge for the Twenty-First Century

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Introduction

Vocational education and training (VET) has become internationally synonymous with the initial formation of intermediate-level skills aligned to national economic priorities. Paradoxically, this has disconnected VET from its central role in the development of expertise in terms of people's lives, their workplace activity, and society more generally. The development of models of learning to facilitate the development of expertise, whether in the context of paid or unpaid work or in relation to leisure pursuits, predates the introduction of nation states (Coy, 1989). There have, of course, been innumerable benefits from the introduction of national systems of education; however, VET has paid a price for becoming overly institutionalized within national education and training systems.

The human capital consensus, shared by policymakers across the world since the 1960s, is that qualifications (whether academic or vocational) are proxy measures for the expertise (expressed as *skills*) employers are looking for when they recruit new workers (see Oliver et al., Chapter 7). The curriculum of VET programs has come to be expressed in the language of measurable skills and competences designed to lead to standardized accreditation. This has led both researchers and policymakers to focus much of their attention on topics such as the comparative study of national "stocks" of skills, participation and achievement rates in VET programs, the alignment of qualification frameworks, and the development of hybrid models to bridge the academic-vocational divide. Hence, the emphasis has been on the supply of skills, with much less attention being paid to the critical issue of *skills utilization*, which is the ways in which employers are willing and/or able to create the conditions in which people can deploy their expertise (see, inter alia, Felstead, Fuller, Jewson, & Unwin, 2009; Livingstone, 2018; OECD, 2017). Considerable attention is also paid to social justice issues in

relation to access to occupations and the promotion of VET as a "pathway" for young people who underachieve in compulsory schooling or are regarded as vulnerable as they make the transition from school to the labor market (see Evans, Chapter 23).

Thus, VET has become primarily conceptualized, studied, and evaluated through an educational lens. As a consequence, work has become the servant of VET rather than its inspiration. Work and workplaces are still seen to be valuable for providing opportunities for VET students to practice or for teachers and trainers to update their own expertise, but these opportunities are framed within the requirements of VET programs and/or professional regulations. This inversion can also be seen in research studies based in disciplines such as labor economics, sociology of work, and political economy. Although the perspective is intended to be on changing patterns in workplaces and industrial sectors, we find the research agenda is often framed within a human capital paradigm in which skills are decontextualized, counted, and critiqued in relation to individual well-being (as in the deskilling thesis) or national economic performance. This generates a path dependency approach to both the study and policy understanding of the relationship between skills, occupations, and industries.

We are not disputing that the issues outlined here are worthy of research and policy attention. Our concern is that their dominance has meant that research and policymaking have become overly *retrospective* as opposed to *prospective* with regard to the relationship between VET, expertise, and work. What is missing is an engagement with debates occurring elsewhere about the following phenomena, which have major implications for VET whether in developed or developing countries:

- First, the increasing use of artificial intelligence (AI) to create the "Internet of Things" (IoT) (Rifkin, 2014) and substitute information technology (IT) platforms for previous organizational models (Srnicek, 2017)
- Second, the concept of "mission-led" innovation based on "co-constructed" partnerships between the state and the private sector (Mazzucato, 2018)
- Third, and arising out of the developments discussed here, the emergence of new forms of work, occupational fields, and expertise based on cross-specialist collaboration (including with consumers) and the increasing interpolation of such collaboration and digital technologies.

These three phenomena encompass both age-old occupational fields and emerging ones. The desire to design, produce, and market goods and services is driven by individuals who have ideas and want to utilize their expertise, by consumer demand, and by the needs of societies more generally. At the same time as we are witnessing the growth of AI-based products and services, there is also a rising demand for those that are handmade, bespoke, and authentic, the makers of which are also benefitting from using the new digital technologies to market and sell their products. This is in line with our initial point that models of learning, which facilitate the development of expertise, predate formalized systems of education and training and emerge from the interaction of people and technologies within work contexts.

Cross-cutting these phenomena is a socioeconomic conundrum about how we might conceive expertise in an age when the value of *intangible assets* (e.g., ideas, knowledge, brands, and networks) is outstripping that of *tangible assets* (e.g., irrigation, electricity, roads, and machinery). The former still rely on the latter, of course, but investment in "intangibles" has become part of the lifeblood of all workplaces. In their analysis of this new world of "capitalism without capital," Haskel and Westlake (2018) argue that continuous (as opposed to only initial) vocational training has a particularly important role because it aligns the development of expertise with changes in work practices and, hence, avoids the trap of trying to second-guess what types of expertise might be needed in an undefined future.

In this chapter, we draw on a range of disciplinary perspectives to examine why: (a) VET researchers and policymakers adopt a retrospective rather than prospective view of the relationship between VET, expertise, and work; (b) there has always been continuity and change in work, and how the major changes that are on the horizon will have an impact on VET; and (c) the concept of skill needs to be replaced by a concept of expertise in discussions about the design and purpose of VET. It concludes with ideas for the development of a new conceptualization of the relationship between work, expertise, and VET, which we term *prospective VET expertise*. This is based on the development of expertise across a process-based continuum: the initial process of formation; the continuous recontextualization, updating, and lateral branching process; and the reformulation process.

We argue that the further VET drifts from concepts of and changes in work and expertise, the less effective and meaningful it becomes. We hope to contribute to a renewed focus in VET research on the critical analysis of the nature and development of expertise in the context of contemporary forms of work and workplaces.

The Continuing Power of the Retrospective Skills-Based Approach to VET

The *retrospective* skills-based view of VET can be traced to the heavy shadow cast by Braverman's (1974) seminal volume, *Labor and Monopoly Capital: The Degradation of Work in the Twentieth Century*, over the definition and use of the term *skill* in Marxist scholarship, industrial sociology, labor process theory, and, by extension, some of the VET literature. Braverman argued that the shift from craft occupations to mass-industrialized forms of production based on the routinization of work in capitalist societies fundamentally changed the relationship between work and the development of skill. He makes this case by drawing on what Attewell (1987) refers to as the "cost" and "control" principles of economic activity. The term *cost* refers to a discernible tendency in capitalist economies in the first half of the twentieth century to divide complex craft tasks into simple routinized steps and to hire cheaper labor to perform those steps, the process known as *Taylorization*. The term *control* refers to management's tendency to

gain knowledge of production and reduce workers to executors of the work process (see Thompson & Smith, 2010).

Braverman (1974) argued,

> In each craft, the worker was presumed to be the master of a body of traditional knowledge, and methods and procedures were left to his or her discretion … the craftsman, like the professional, was required to master a speciality and become the best judge of the manner of its application to specific production problems. (p. 109)

He contrasted this with the reorganization of work in the period from the 1900s to the 1970s into low-skill jobs lacking any conceptual content, which occurred as management appropriated the intellectual knowledge and skill once held by craft labor. This dissolution was accomplished through "the separation of conception and execution" (Braverman, 1974, p. 124).

Braverman's thesis has been questioned by some writers operating with an industrial sociology or labor process perspective. This includes his tendency to imply, first, that managers impose their will in the workplace without significant resistance from labor and to gloss over the countertendencies to deskilling that have manifested themselves in different industrial sectors (see Burawoy, 1979). Second, he uses a rather circumscribed notion of the term *specialization* to refer to work that can be learned quickly and does not require planning or abstract knowledge on behalf of the worker (Attewell, 1987, pp. 330–332). From this perspective, it is difficult to grasp that the form of specialization associated with, for example, the work of stonemasons, hairdressers, pharmacy technicians, radiographers, chefs, and electricians presupposes considerable expertise.

We, however, adopt a different approach. We argue Braverman's argument has led, albeit unintentionally, to a retrospective focus on skill in VET for two reasons. The first is his "romantizisation" (Attewell, 1987, p. 332) of a particular kind of craftwork, which he understood to require minimal formal education and a long apprenticeship. These examples of craftwork, including the mechanical engineering example he cites, can be described as "turn-of-the-twentieth-century" work—in other words, forms of work that existed prior to the development of advanced science and IT. One consequence is that many of the above as well as other forms of work now require higher levels of domain knowledge. A more complex relationship has therefore existed between formal education and employment for many decades in industrial societies, compared with the early part of the twentieth century. Braverman's attachment to forms of craftwork based on his belief that the unification of conception and execution constituted the definitive definition of skill precludes him, however, from accepting this development. Instead, he treats the higher-level entry requirement as evidence of what has come to be known as "credential inflation" (Collins, 1979).

This is problematic, from our perspective, for the following reason. If we follow Braverman and assume that qualification requirements reflect cultural rather than technological demands, then it is reasonable to question his description of the longevity of craft apprenticeships as being solely driven by the "knowledge to be assimilated, the dexterities to be gained, and the fact that the craftsman … was required to master a speciality" (Braverman, 1974, p. 109).

Becoming a "master" certainly took time, but the length of apprenticeships (known as *time-serving*) was a means by which the craft guilds sought to protect their "secrets" and keep apprentices under the control of their masters for as long as possible to prevent poaching (see, inter alia, Davids & Munck, 2014; Epstein & Prak, 2008; Ogilvie, 2014). From the late nineteenth century onward, trades unions maintained time-serving as a way to protect older workers from being replaced by the much cheaper labor provided by apprentices. The quality of apprentice training has always been highly variable (Fuller & Unwin, 2012; Lane, 1996; Ogilvie, 2014). Because Braverman's primary concern was the denigration of work, he was less concerned with whether the reasons for the previous organization of work, especially apprenticeship, justified its time-served character.

The second reason is that Braverman's definition of skill as the unity of conception and execution glosses over the interconnected nature of forms of work, where it has been very difficult for many centuries for one person to conceive and execute the entire work process. An insightful discussion of this issue can be found in Hutchins's (1995) classic book, *Cognition in the Wild*. Hutchins argues conceptually and empirically that cognition has always been distributed and mediated within the division of labor between people and artifacts, and illustrates this through reference to nautical navigation. His analysis of the distributed and mediated nature of the forms of cognition associated with nautical navigations allows us to appreciate the way in which the division of labor may simultaneously differentiate some forms of work and expertise, but also interconnect them in terms of a common goal and working relationships, so they coexist alongside one another in both traditional and modern navigation.

The reason the distributed and mediated nature of cognition has historically been overlooked, as Hutchins observes (1995), is because researchers, irrespective of their anthropological, psychological, or cognitive science lens (and we would add a Marxist or industrial sociological lens), have taken individuals as their sole unit of analysis, rather than the distributed relationship and process of communication between workers. Thus, they have viewed learning and the development of skill as an individual accomplishment. Paradoxically, this is also true of Braverman as he restricts his analysis of the work process to only those forms of work that can be conceived and executed—in other words, learned and performed—by an individual.

The second reason for a retrospective rather than prospective discussion about skill in VET is the way in which the increasing demand from supranational agencies for the international harmonization of both academic and vocational qualifications has exposed the different ways in which countries classify and value skills. The *Varieties of Capitalism* thesis attributes those differences to the wider political economy in which skill formation takes place (see Busemeyer and Trampusch, Chapter 8; Hall & Soskice, 2001). From this perspective, each country's VET system will reflect the underpinning assumptions about how work should be organized and the economic and societal role and value of skills. Hence, the USA, the UK, and Australia are characterized as being overly narrow because they conceive skill as being derived from individual tasks assigned to job roles, which sit within flexible labor markets. In contrast, countries such as Germany and France, with more regulated labor markets, conceive skill

formation as a process of occupational capacity building that extends beyond an individual's immediate job role (see, inter alia, Brockmann, Clarke, & Winch, 2011).

Although accepting the theoretical, empirical, and analytical strengths of the Varieties of Capitalism thesis, Thelen (2004) acknowledges the pitfalls of turning it into a rigid path dependency model. The danger is that countries and their systems can become locked into static and normatively constructed typologies. This is particularly noticeable in the field of apprenticeship research. The endurance of apprenticeship in both developed and developing countries and across all forms of occupation is remarkable (see Chapter 3 by Billett and Chapter 5 by Fuller). This can be attributed to its power as a model of learning that privileges practice, allowing it to adapt to changes in the mode of production, the division of labor, and scientific knowledge over time. However, because apprenticeship is also an institution within some countries' national education and training systems, there has been a strong research focus on the institutional arrangements of apprenticeship rather than on its relationship to work (see, inter alia, Rauner & Wittig, 2010; Ryan, Backes-Gellner, Teuber, & Wagner, 2013). Institutional-based studies are important as they highlight and analyze the conditions that can hinder and facilitate the provision of VET in different countries. However, the focus on differences between individual countries and the assumption that skill formation is largely found within national VET systems mean that insufficient attention has been paid to differences *within* countries. Thus, both good and weak examples of VET practice within a country will be overlooked because they do not accord with the typology. Research can then render invisible the work-related basis of VET practice and prevent us from examining the factors that are driving new forms of practice within the same sectors or occupations in different countries.

Taking a longitudinal perspective, Thelen (2004) shows how assumptions about how certain features of national VET systems came about may be questionable. She argues, "The problems (and solutions) that emerged historically are what lie behind some of the striking contemporary national differences in training regimes" (Thelen, 2004, p. 16). This chimes with Busemeyer and Trampusch's (2012) argument that skill formation is a "dynamic and contingent process" (p. 4), because within every country we find "conflictual renegotiations and transformations of institutional arrangements" (p. 34). This is pertinent to our argument about the prevalence of a retrospective view on skill in VET, because it enables us to understand why *skill* is the dominant lexicon of VET and *expertise* the dominant lexicon of the professions. We will return to this argument in our concluding section, when we put forward the case for an expertise-based approach to VET as opposed to a skills-based approach.

Continuity and Change in the Work Process

The increasing impact of cognitive technologies spawned by AI have come to dominate current debates about the ways that the world of work and the structure of employment and consumer behavior are changing. This has led to doom-laden forecasts about a further intensification of labor market polarization in developed countries, leaving a hollowed-out "hourglass" with high-skilled jobs at

the top, low-skilled jobs at the bottom, and very little in between (see, inter alia, Autor & Dorn, 2013). Berger and Frey (2016, 2017) argue that although digital technologies have not so far created many new jobs, they do generate demand for services in the areas they are located, albeit in the so-called *skilled cities* where the new technology jobs tend to be clustered. Ultimately, the spread of digital technologies throughout the economy will increase the demand for workers with analytical skills who can manipulate and interpret data, solve problems, and interact with the world outside their immediate workplace, wherever that may be.

A sobering antidote to the argument that technological progress is always innovative and useful comes from Edgerton (2008), who takes a historical view to argue for a "technology-in-use" perspective. This reveals which technologies have proved to be the most important (and adaptable) over time and continue to be useful in both developed and developing countries and in both formal and informal economies. Edgerton uses the term "creole technologies," meaning "local derivatives of something originally from elsewhere" (p. 43), to capture the way people adapt both new and old materials. A particularly successful example is the sustainability of the bicycle (invented in Europe in the first half of the eighteenth century) as a means of mass transport in the emerging megacities in India and China in the twentieth century. An offshoot was the invention of the "cycle-rickshaw," derived from the hand-pulled rickshaw. Edgerton argues that this was an "urban, not a rural, machine," as "rickshaws needed the metaled roads which were built for cars and buses and lorries" (p. 47). Far from being dispatched to a museum or scrapyard, cycle-rickshaws can now be seen in London, New York, and Paris, along with other derivatives such as pedicabs and "tuk-tuks."

Edgerton (2008) argues that his "technology-in-use" perspective "yields a global history, whereas an innovation-centred one, for all its claims to universality, is based on a very few places" (p. xi). This is important for discussions about the purposes and design of VET because it reconnects the range of occupational fields (from "craft" and "trade" through to digital technologies) and brings them within the orbit of VET. This is in line with our conception of a prospective approach to VET that starts from the premise that technologies, practices, and the nature of work are in constant flux. This is as true for the crafting of bespoke luxury handbags or kitchen tables as it is for aerospace engines or software. The producers of the former depend just as much on their intangible as well as their tangible assets as the latter. Rather than treating each new "innovation" as a unique phenomenon, Edgerton's analysis helps us to see technological development as a process of layering—each step forward builds on existing expertise, with some developments once perceived as "innovative" being jettisoned along the way.

This layering of technological development requires investment in and use of both intangible and tangible assets, but, as Mazzucato (2013, p. 27) explains, firms and industrial sectors have also been supported and sustained by nation states creating an "innovation ecosystem" (see Oliver et al., Chapter 7). The state and private sector play an entrepreneurial role as regards facilitating innovation. However, the role of the state has remained hidden, especially in the USA and UK, although much less so in Germany and Japan, as successive governments have bowed to criticisms about the state's role in innovation as equivalent to

trying to "pick winners" or "prop up" failing companies. By downplaying the role of the state in facilitating the innovation ecosystem, it becomes easy to attribute Apple or Google's success to "hero" entrepreneurs, rather than acknowledge that every state-of-the-art technology in Apple's array of products and services is an achievement supported by government-funded research on military spending or that the algorithms Google employed were funded by the USA's National Science Foundation grant.

Initially seen as the foundation for a "Network Society" (Castells, 2011), the creation of the World Wide Web paved the way for what is increasingly referred to as the IoT. Rifkin (2014) offers one of the clearest expositions of the concept. He argues that a powerful new technological platform is developing out of the bowels of the Second Industrial Revolution, and accelerating the tensions in the capitalist mode of production toward a "Collaborative Commons" characterized by a deep desire to connect with others and share to create a sustainable life. This emerging platform is centered around

> the coming together of the Communications Internet with the fledgling Energy Internet and Logistics Internet in a seamless-twentieth-first century intelligent infrastructure – the Internet of Things. (Rifkin, 2014, p. 11)

The IoT will, supposedly, connect everything with everyone in an integrated global network. Virtually every aspect of economic and social life, for example people, machines, natural resources, production lines, logistics networks, and consumption habits, will be linked by sensors and software to the IoT platform, continually feeding Big Data into every node: businesses, government departments, networks, and so on. For this to happen, the data generated by the creation of the IoT will have to be processed with advanced analytics, transformed into predictive algorithms, and programmed into systems that the different nodes attached to the IoT can utilize to improve thermodynamics, increase productivity by reducing production costs, and deliver goods and services across the entire economy. The challenge for companies, according to Rifkin (2014), is to create a "new business model" (p. 15) that will mesh together previously separate functions, for example IT, energy, logistics, and infrastructure.

This new business model has been referred to by Srnicek (2017) as "platform capitalism." Srnicek (2017) defines a platform as "digital infrastructures which enable two or more groups to interact" (p. 43), and distinguishes between five types of platform: advertising platforms (e.g., Google and Facebook), Cloud platforms (e.g., AWS and Salesforce), industrial platforms (e.g., GE and Siemens), product platforms (e.g., Rolls-Royce and Spotify), and lean platforms (e.g., Uber and AirB&B). What is distinctive about platform businesses, according to Srnicek (2017), is that they are reliant on "network effects," in other words, the more numerous the users, the more valuable the platform, and the greater the scope for intangible innovation and potential growth in work. Innovation here is downstream from Edgerton's technology-in-use perspective and Mazzucato's (2013) national innovation ecosystems, and exemplifies Haskel and Westlake's (2018) argument that "intangibles" have become part of the lifeblood of all workplaces.

Concerns about the impact of technological change on work and employment have been recorded throughout history (Hobsbawm, 1998). A reduction in the

volume of employment (in terms of both the number of jobs and hours worked) has been simultaneously perceived as a means for freeing people to enjoy more leisure time (Srnicek & Williams, 2016) and denounced as a threat to societal order and against what is regarded as the human being's natural desire to be active (for a detailed critical review, see Edgell, Gottfried, & Granter, 2016). We are certainly not arguing, therefore, that the emergence of platform firms or AI is unproblematic. In their wake, they and their owners are generating much criticism, fear, and resistance as they ride over existing supply-and-demand arrangements, tax regimes, employment rights, and, critically, individual rights to privacy, without sufficient control.

We would, though, concur with Haskel and Westlake (2018), Srnicek (2017), and other writers making similar arguments (O'Reilly, 2017) that (a) platforms may constitute the future basis of the organization of much work in the private and public sectors, (b) intangibles will be a major source of innovation, and (c) intangibles presuppose new forms of learning.

The implications of cognitive technologies, AI, and the IoT are already being debated in the research literature on the "professions." Susskind and Susskind (2017) argue that "increasingly capable systems will transform the work of professionals, giving birth to new ways of sharing practical expertise," which will lead to the "dismantling" of the current professions (p. 271). They divide the likely reaction to their thesis as between people who see it as offering "liberation" and those who would prefer "enclosure" (Susskind and Susskind 2017, p. 304). The former welcome the expansion of an Internet-based society in which "practical expertise" is common property and free of gatekeepers, and so can be used for the purposes of promoting social justice. In contrast, those in favor of enclosure (including online service providers) point to intellectual property rights, the need to protect incomes, and the need to ensure "experts" remain in control of how knowledge is disseminated and interpreted. From the perspective of the formation of expertise, we argue that technological change results in the "re-functionalization" of professional work and the further integration of professional and vocational activity. The former trend has occurred as professions, such as town planning, whose original function was to "legislate" with respect to possible courses of action, have been forced through legislative complexity to act as "advisers" to the regeneration process (Ward, 2018). The latter trend has occurred as developments in the private sector have resulted in more cross-functional work in engineering (Brown, Rhodes, & Carter, 2004), and also as governments have sought to usher in a "culture of cooperation," especially in the building industry, and architects, structural engineers, and builders are encouraged to work in a less adversarial and more collaborative way (Bishop et al., 2009).

These developments in the work process introduce a new dynamic in the formation of expertise and, thus, provide a key challenge for the future design and delivery of VET throughout a worker's life. That dynamic is the interplay, through the work process, between what Barbour, Sommer, and Gill (2016, p. 57) term the technical, arcane, interpersonal, and embodied modes of expertise and what Boltanski and Thévenot (2006) refer to as the "six conceptions of worth." We discuss these concepts in the "Conceptualizing Expertise" section. Understanding the shifting relationship and the balance between "tangible" and

"intangible assets" is crucial for the development of a prospective expertise-based approach to VET. It has the potential to liberate VET from its increasingly narrowly defined framework of atomized skills and competencies. Yet, debates about and policies for VET are still partly informed by concepts of the nature of work that were developed many decades ago and result in bounded classifications such as the following: Work can be skilled, low-skilled, or unskilled, despite the fact that here *skill* simply means that formal qualifications are required for entry; disciplinary knowledge is preeminent and only acquired through formal education; and, because occupational categories are presumed to be accurate descriptors of the work people do, a period of initial training is sufficient to sustain performance. In the "Conceptualizing Expertise" section, we discuss how these bounded conceptions of work, and therefore of expertise, have arisen and the ways in which they have been challenged.

Conceptualizing Expertise

Earlier in this chapter, we highlighted the legacy of Braverman (1974) in the skill-based approach to VET research and policy and argued that we intended to use the concept of "expertise" as our overarching term to conceptualize the relationship between work and VET. There are a number of reasons for this. First, and foremost, the concept of expertise embodies both the practical and theoretical components involved in the performance of work of all kinds. This universality enables us to examine how expertise is conceived and developed across occupational boundaries and national systems. Second, and relatedly, it is this fusion of the practical and the theoretical domains that creates the challenging conditions in which VET curricula and pedagogical approaches are developed. The research literature presents contrasting views about the nature of the theory–practice interplay. Some writers stress a close relationship between theoretical knowledge and practical knowledge, skill, and ability (Jensen, Lahn, & Nerland, 2012; Winch, 2010; Young, 2008), whereas others conceive a more multifaceted relationship, including the mediating role of artifacts (Brown & Cook, 1999; Fenwick and Nerland, 2014; see also Broad and Lahiff, Chapter 22). Third, the terms *skill* and *competence*, which have come to dominate both research and policy debates about VET, are linguistically, culturally, and analytically problematic (see, inter alia, Brockmann et al., 2011).

The concept of expertise has been subject to a rich and sustained discussion in the philosophy of expertise (Selinger & Crease, 2006) and the psychology of expertise (Anders Ericsson, Charness, Feltovich, & Hoffman, 2006) for many years. One unifying thread between these domains is adoption of an insular perspective that views expertise as a one-dimensional individual accomplishment in a field of activity, captured by the phrase *mastery*. Another unifying thread is a tendency to view expertise as a stage-based and linear process of development. Recent work in science studies from Collins and Evans (2007), which shades a little into the philosophy of expertise, has, however, introduced the idea that expertise is characterized by three different dimensions: (a) original specialization, (b) meta-specialization (connoisseurship), and (c) meta-criteria (track record).

Although interesting, this development nevertheless maintains a focus on individuals and stages rather than following the logic of its own argument and looking at the interrelationship between the three dimensions of expertise. Furthermore, and in common with work in the philosophy and psychology of expertise, it uses a decontextualized account of expertise: People are viewed separately from context and, in particular, the context of work.

The above problem has, however, been addressed through sociocultural perspectives over the last few decades by introducing a unit of analysis that encompasses practice and context. Initially, Lave and Wenger (1991) reconceptualized the classic conception of expertise as the movement of a "newcomer" (or apprentice) from the periphery to the center of a "community of practice" by emphasizing the role of learners' participation in work practices. Hutchins (1995) extended Lave and Wenger's argument about the constitutive relationship between practice and context by highlighting how expertise has in most occupations always been distributed between mind, technology, and the practices that unify them. Engeström (2008) and Edwards (2010) have further extended this argument by taking more contingent forms of work as their unit of analysis and introducing, respectively, the concepts of "knotworking" and "relational agency" to draw attention to the simultaneous, multidirectional, and reciprocal dimensions of expertise. At the same time, other writers have given renewed attention to the role of judgment in different forms of expert work (Guile, 2010; see Hager, Chapter 4) and to the reciprocal learning relationships—experts learning from novices—in apprenticeship (Fuller & Unwin, 2004a, 2004b).

A third strand of theoretical development, which both connects and differs from the cognitive and the sociocultural perspectives and the concepts of practice and participation, focuses on the sociomaterial dimension of learning. Its foundations lie in poststructuralism, material sociology, actor network theory, and organizational science (Orlikowski, 2007). This approach integrates human actors with the social, biological, and material forces that together generate the dynamic and contested contexts in which learning emerges through practice (see Fenwick & Nerland, 2014; see also Nerland and Damşa, Chapter 20). In drawing attention to the sociocultural and sociomaterial influences, it is possible to adopt a wider perspective on expertise compared with the insular and individual approaches found in the philosophy and psychology of expertise. The trap that has to be avoided, however, is assuming that there is a linear relation between study and the development of expertise or that expertise is purely internal to the moment of activity responsible for its creation. We have endeavored to overcome this in our depiction in this section of the features of expertise, which emerges from the above discussion:

1) *Individual:* Concept of specialized knowledge and capability, judgment, ability to work unsupervised
2) *Collective:* Residing in teams, relational, co-produced, distributed
3) *Cross-occupational:* Connected to the above, but emerging as an independent category from new forms of work practice, production, and work organization and assisted by technologies as boundary-crossing tools (e.g., computers and 3D printing)

4) *Sociomaterial:* Emerging from the temporal interaction of social and material phenomena
5) *Practice-based:* Involving individual and collective honing of skills. It does not necessarily mean there is an achievable point, although expert status may be awarded.
6) *Definable and measurable:* Through formalized mechanisms such as qualifications and professional registration, or through customer endorsement.

Formal VET tends to be aligned with 1, 5, and 6, as 2 and 3 are seen as belonging to and/or only possible within the domain of the workplace. This explains why VET tends to be associated with initial "skill" formation. There may be an implicit understanding of the sociomaterial dimension in specific fields of VET that involve high levels of sensory competence, such as carpentry, catering, handcrafted ceramics, or glassblowing. How far this is a formalized dimension within VET (in everyday practice, in teacher training, or through curriculum design) is a question that cries out for further research (see Broad and Lahiff, Chapter 22).

Whatever area of work they are in, individuals will be subject to some external regulation (e.g., health and safety; industry-specific standards) and will spend some time keeping abreast of technical innovations, shifts in consumer preferences, and the performance of competitors in their field. They will all develop and utilize a combination of technical expertise and knowledge specifically related to the occupational tasks they undertake as well as expertise and knowledge related to the interpersonal nature of their work. Their employment conditions and the economic context in which they and their work are situated will, however, have an impact on how far they are able to both develop and utilize their expertise (Livingstone & Sawchuk, 2004; Payne, 2009; Unwin, 2017). The monetary and social value of their expertise will differ, as will the levels of satisfaction they derive from their work.

Although we are very indebted to the concepts and theories discussed here, our introduction to recent work in the field of communication studies is proving valuable. This is because it offers conceptual insights and frameworks to reconnect the concept of expertise with the individual and the object of their practice, the forces that bring that relationship into being and shape that practice, and the spaces in which practice occurs. It is this complex interplay that is both a challenge for VET and its underpinning foundation.

Barbour et al. (2016) offer the following helpful definition of the relationship between expertise and communication:

> Expertise is not just an attribute, but it is a capacity for action.... Expertise and communication are related in that experts employ and develop different forms of what they know in and through communication. Expertise is organizational in the sense that it is embedded in networks of relationships emergent in organizing … and extra-organizational in that expertise authority depends not just on the understandings of the local others' judgments about the expert. (p. 57)

Drawing from empirical studies, including for example of construction workers in the nuclear power industry, they argue that the performance of expertise—or "the application of knowing to solve problems" (Barbour et al., 2016, p. 57)—involves a combination of the following dimensions:

- Technical (specific knowledge required to perform)
- Arcane (rules, history—as in a "community of practice")
- Interpersonal (relational aspects of practice)
- Embodied (physical conduct of work and the space in which it takes place).

This taxonomy bridges what is often presented as a divide between "explicit" and "tacit" forms of knowledge. The institutional conception of VET tends to focus on the technical, with some attention to the arcane, and to separate the "interpersonal" from practice, as in so-called generic or soft skills. Attention to the "embodied" aspect of expertise may be given, although not necessarily articulated, and may be encompassed by a more generalized notion that there is a tacit realm to any area of expertise—as when trainee carpenters are encouraged to keep running their hands along a piece of wood or chefs are encouraged to "feel" the moment when a sauce starts to thicken.

This connects to Knorr Cetina's (2001) argument that expertise involves the manipulation of technical objects (e.g., a carpenter's tools), which are fixed and epistemic objects (e.g., a client in a hairdressing salon), which are always under construction by intra- and intercommunities of practice (see Nerland and Damşa, Chapter 20). An object, such as a design for a building, can turn back into a technical object when the problem, such as its fabrication, is solved. Neither type of object is inherently technical or epistemic; rather, they change back and forth according to the nature of the situation in which they are being manipulated. In his introduction to a collection of essays about the problem-solving nature of craftwork and the fusion of the technical and epistemic, Marchand (2016) argues that a critical dimension of that fusion involves making mistakes and that this is "acknowledged as a productive starting point for learning" (p. 3; see also Boldrini & Cattaneo, 2013).

People in intracommunities work by themselves within their own specialist field (e.g., engineers), whereas they may be members of different (inter)communities working together (e.g., engineers and architects). This is important for our argument because it shifts the point of analysis back to the nature of work being undertaken and its influence on the development of expertise, as opposed to using the construct of professional and occupational demarcations as the starting point for the study of how expertise is being developed. In doing so, it sheds light on the distributed and relational nature of expertise in contemporary workplaces.

From their communication studies perspective, Kuhn and Rennstam (2016) argue that expertise has been conceived in two ways: (a) "autonomous" in that the expert "has acquired relevant training and accumulated the necessary experience within a field to perform some task at a level superior to a novice"; and (b) "attributed," meaning that the label of expert is "affixed to an actor only by

relevant others in (or with reference to) the conduct of practice" (p. 25). If expertise is conceived as "attributed," then this allows for a different analytical approach because it switches attention away from expertise being regarded solely from the perspective of something that resides in an individual's head to a negotiated and contingent phenomenon whose meaning and status are constantly in flux. This requires individuals to *communicate* their expertise through their practice in order to be acknowledged as experts.

They continue,

> Expertise names the practice of directing skill toward particular problems encountered in practice; those problems emerge from, are recognized in, and are justified through communication. Expertise ... is a claim to knowledgeability that appeals to an audience engaged in a practice. In turn, authority becomes less about securing others' obedience than about claims to decidability—along with the concomitant promise of value to be produced by the decision advocated by the actor. Claims to authority can be based upon expertise or position and these resources are often in tension in organizing. (Kuhn & Rennstam, 2016, p. 27)

Thus, expertise and authority are not fixed notions, as they are subject to social, cultural, economic, and political influences; hence, "who is to be considered an expert and what sorts of knowledge are valued as the basis of expertise depend upon the practice under consideration" (Kuhn & Rennstam, 2016, p. 26). Expertise communicates itself through accomplishment.

The value and esteem afforded to expertise emerge for different reasons and are subject to change. Kuhn and Rennstam (2016, p. 30) cite Boltanski and Thévenot's (2006) six "worlds" or "economies of worth" as useful vocabulary for "understanding value as the product of forms of justification (i.e. claims) manifest in practice":

- *Market:* Value measured by price
- *Inspired:* Value arising from the domain of art, passion, and creative talent
- *Civic:* Value arising from serving the public good
- *Domestic:* Reflecting family loyalties, heritage, and hierarchies
- *Fame:* Value measured by celebrity
- *Industrial:* Value measured and achieved by methodical planning, technical efficiency, and scientific precision.

This taxonomy allows us to deepen our argument about the attributed nature of expertise by drawing attention to the ways in which individuals and teams seek to justify the value of their expertise through the relational forms of practice they engage in when they collaborate with other experts, either within their occupational field or across different fields addressing tangible or intangible issues. An example would be architects, engineers, carpenters, and plumbers working on a construction site and attempting to strike the best balance between aesthetic, technical, and financial considerations in relation to a construction problem. The architects might justify their recommendations on the basis of the "inspired" nature of their expertise, possibly also invoking "fame" values.

The engineers might justify their recommendations on the basis of the "industrial" and "civic" nature of their expertise, while the carpenters and plumbers might justify their response to the architects and engineers through reference to the "industrial" value of their expertise. For all these actors, "market" value would also be important. The taxonomy has the potential, therefore, to broaden the scope of inquiry on expertise as it exposes the different and dynamic ways in which expertise is afforded recognition and status, regardless of the occupational context. As such, it provides a potential framework for enabling (a) VET to break free of its institutional straitjacket, and (b) VET teachers and trainers and their students to examine how their practice relates to changing conceptions of its value as formulated outside the confines of where it sits in relation to levels and hierarchies within a national education and training system.

A Potential Framework to Develop Expertise in VET

Our argument is that VET arises from and supports the development of expertise and that this occurs across a continuum of overlapping processes that feed into each other: the initial process of formation, the refreshing and updating process, and the reformulation process. Perceiving these processes as a continuum is a way to discourage the rigid level-based or staged-base separation of vocational learning that characterizes most VET systems. It also provides a means of asserting the dynamic and contingent nature of expertise: It will be necessary to revisit and at times reject what one learned in each phase (to commingle capacities); hence, learning is not a linear process. Each process needs to be underpinned by a concept of expertise that enables an individual to understand that (a) they are engaged in a multifaceted process of learning that will draw on different sources and types of knowledge (including their own), and (b) their expertise will be formed through practice and in relation to other people and different technologies and be subject to shifting formulations and value judgments. The centrality of practice provides VET with the means to create experiences that help individuals to anchor their learning through connection to a recognizable (albeit fluid) *occupational field*, while also showing them how to use their expertise to cross boundaries and challenge fixed ways of working.

We have used the term *occupational field* to question whether the concept of *occupation* needs to be refreshed in the light of the fluidity in both the nature of work and workplaces and the considerable potential of digital technologies to break down overly rigid occupational boundaries. Using the construct of *occupation* is still helpful for three reasons: First, entry to many (and often relatively well-paid and more secure) areas of the labor market is through an occupational structure; second, individuals relate to the notion of belonging to an occupational community; and, third, many people still work in occupationally bounded roles (see Fuller, Chapter 5). This provides a strong foundation for the design of VET programs and for teachers and trainers to motivate learners. The problem is that a rigid adherence to the concept of occupation has contributed to the institutionalization of VET in relation to its positioning as a (predominantly)

"intermediate" phase in national education and training systems. Yet, work processes, even within seemingly rigid occupational boundaries, have always been subject to change. We may be witnessing, therefore, a shift in the way individuals identify themselves in the following ways:

- *Occupational:* "I **am** (e.g., an electrician, chef, accountant, lawyer, barista)."
- *Hybrid:* "I **am** (a manager, an administrator, a consultant)."
- *Fluid:* "I **work in** (IT, marketing, the creative sector)."
- *Unspecified:* "I **am starting/building** (a social enterprise, a start-up, a pop-up)."

Utilizing the concept of *occupational field* offers a starting point to reconnect VET with the concept of expertise. We would like to conclude this chapter, therefore, by articulating some principles that could be used to redesign VET programs so their goal is to explicitly develop the forms of expertise contained within the taxonomy of expertise we introduced earlier (technical, arcane, interpersonal, and embodied). Our starting point is two concepts from our previously separate work as researchers: expansive learning environments (Fuller & Unwin, 2004a, 2004b, 2010) and recontextualization (Guile, 2010, 2014). The former concept emerged as part of Fuller and Unwin's longstanding program of work to identify a range of organizational and pedagogic factors that influence the way apprentices experienced learning in different occupational contexts. Two ideas, in particular, underpinned the formation of the concept of expansive learning that pertains to our earlier discussion of different conceptions of expertise. First, there is Lave and Wenger's argument that learning is a situated practice and therefore integral to all social activity whether it occurs in an educational or workplace context, and is therefore influenced as much by learners' prior backgrounds, experiences, and aspirations as it is by the possibilities of occupational practice. Second, Fuller and Unwin refocused Engestrom's (2001) concept of "expansive learning" from his concern with organizational development to their concern for the features of an organizational setting that may create opportunities for, or barriers to, learning. The concept of expansive learning environments has therefore always placed people and the decisions they make about the design of education and work, or their engagement with either, at the heart of the working and learning processes.

The concept of recontextualization emerged as part of Guile's research on the difference and similarity between forms of learning, irrespective of whether they were classified as formal, nonformal, or informal, or as explicit or implicit. It shares a similar starting point to the concept of expansive learning environments, namely, that all forms of learning are situated in practice. It supplements the argument that learning occurs through participating in practice with the idea that when people are working across practices (intercommunity), learning can also involve the commingling of practice, both of which are continuous mutually informing processes. This involves a process of inferring, in other words, working out what follows from the tangible aspects of practice, such as conversations, instructions, access to technologies, and other dimensions of the work context, and what might follow from the intangible aspects of practice, such as ideas that crop up during, after, or outside the work process. In short, it restores cognition and anticipatory activity to participation. Thus, the concept

of recontextualization has been formulated to reveal the inferential dimension of what is often referred to as *connecting* or *relating* theory to practice or practice to practice.

The concepts of expansive learning environments and recontextualization have, therefore, more affinities with one another than has been previously acknowledged. Contained within both is an implicit argument that the development of expertise emerges through the interplay of process and context. The concept of expansive learning environments can be used to provide a holistic perspective on the different, but related, characteristics of the context for working and learning and their role in the development and deployment of expertise. For example, learners require access in educational institutions to the forms of knowledge and the types of technology that they may encounter embedded in occupational practice in workplaces, as well as access in workplaces to opportunities to develop, refine, and utilize their occupational capabilities to engage in tangible and intangible activity. Through a range of empirical case studies of apprentices and workers more generally, Fuller and Unwin (2014) have shown how learning environments can be analyzed using their Expansive-Restrictive Framework to identify where changes can be made (both internally and externally to the immediate context) to create more expansive opportunities for learning (see also Felstead et al., 2009).

In the case of recontextualization, the concept can be used to provide a holistic framework for analyzing the way in which learners understand the relationship between theory and practice in their own occupational field, as well as to prepare them to also engage with that relationship in other professional fields. For example, learners require support to infer (a) why and how theories or concepts they have learned in an educational context that pertain to their occupational field manifest themselves in artifacts, routines, and conundrums in a workplace context, and vice versa; (b) how to vary their approach to artifacts, routines, and problems when they are involved with tangible and intangible activity when working with specialists from other occupational fields; and (c) how to justify the judgments or recommendations they make to members of their own and other occupational fields. This form of support can be provided by a range of people with different types of experience, including for example teachers/tutors, occupational specialists, peers, and so on.

It is beyond the scope of this chapter to explore these issues in detail. Instead, we have adopted an intermediate strategy. We have constructed a framework to support the development of prospective expertise that is based on (a) the relationship between expansive learning environments, recontextualization, and a taxonomy of expertise (technical, arcane, interpersonal, and embodied); and (b) our articulation of two main principles for the development of those types of expertise. The first is *access*, and the second *inference*. We have used the principles of (a) *access* to highlight the contribution that educational institutions and workplaces need to make to assist learners to develop each mode of expertise; and (b) *inference* to highlight the different processes that learners engage in to develop each mode of expertise. This is captured in Table 2.1.

We conclude with some observations about the development of these modes of expertise in relation to Boltanski and Thévenot's (2006) six "worlds of worth"

Table 2.1 Prospective expertise and VET: Toward a framework for development.

Expansive learning environment (education, training, and work)	Recontextualization (education, training, and work)	Modes of expertise
Access to and participation in practice-based knowledge, conceptual thinking, and technologies in work context; and to domain knowledge and further practice in education and training context	Inferring what follows from concepts and technologies for practice, as well as opportunities to infer what follows from practice for education	Technical
Access to history of development of practice and technologies in occupational fields, and history of deployment of practice, including use of technologies	Inferring what follows from history of development and deployment of practice, including technologies for further development of practice	Arcane
Access to and participation in relationship between practices, and opportunities to cross boundary between practices and occupational fields. Access to reflection-on and in-action via team leaders, mentors, colleagues, etc. Opportunities to take action to challenge restrictive practices through knowledge of where barriers to expansive learning reside (both internal and external to work and education contexts)	Inferring what follows from boundary crossing, reflections on boundary crossing, and issues that crop up through boundary crossing for extant and future own practice and practice of others	Interpersonal
Participation in intra- and interoccupational practices	Inferring what follows from intra- and interperformance of practices	Embodied

(market, inspired, industrial, fame, civic, and domestic). To do so, we return to our earlier argument that in an age when the value of intangible assets is out-stripping that of tangible assets, there are significant implications for the development of expertise. From our prospective perspective, a vocational expert will develop and evolve the four types of expertise referred to here as they collaborate with other experts from the same or different occupations in expansive learning environments on the product or service they are working on, and also on their "intangible" development. That interexpert community will be continually justifying their technical, arcane, interpersonal, and even embodied judgments to one another and to their intracommunities of practice through recourse to the six worlds of worth. On some occasions, financial considerations may override inspired conceptions; on other occasions, inspired and industry conceptions may take precedence over market conceptions.

In the aerospace industry, for example, the scope of apprenticeship training has expanded in recent years in line with the increasing collaboration between

the production process and customer service (from initial design through to "aftercare"). Engineering apprentices develop their technical, arcane, interpersonal, and embodied expertise through the practice of making aerospace products as part of both specialist and multiskilled project teams. They are expected to contribute knowledge and ideas to those teams from early on in their training and, hence, to justify their place in the team (see Lahiff, Li, Pilz, & Unwin, 2018). Through constant communication with peers, more experienced colleagues, and customers, the apprentices build their understanding of the dynamic interplay between the six worlds of value that constitute how their work is valued. That interplay will vary according to the status and nature of the work of the enterprise: For example, "fame" will be associated with an international aerospace company, whereas "domestic" value may apply to a smaller company in its supply chain, and "civic" value may accrue from being part of an industry that is important for a national economy.

The crux of our argument is that vocational experts are engaged in justifying and acquiring further justification for the four different types of expertise they develop in different contexts in accordance with different conceptions of worth, and that this is a progressively recurring process. In the current retrospective concept of VET, worth is largely attributed to expertise through the achievement of qualifications or completion of a course and sustained, if necessary, through further training. However, rather than conceiving expertise solely as a process of achievement and application, its development is contingent and relational, and requires continual refreshment through practice to gain the types of attribution it requires to sustain and justify its worth over time and in an increasingly intangible world. VET has a key role to play in this process, but this requires institutions, teachers and trainers, and learners to be in a close relationship with work.

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3

Vocational Education and the Individual

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Introduction

To fully understand the purposes, processes, and outcomes of vocational education, it is essential to place individuals at the center of those deliberations. The origins of national systems of vocational education were largely institutional, arising from the social world (Searle, 1995) or what Dewey (1916) refers to as the "social side." Increasingly, they are constrained by institutional factors (e.g., governmental imperatives, demands of industry). Yet, ultimately, individuals who work and learn within them shape how these educational provisions are enacted, sustained, and transformed. Dewey refers to this as the "personal side." The importance of positioning individuals centrally within vocational education has perhaps never been greater as institutional governance, suggestions, and requirements become more intense and ubiquitous. Yet, concurrently, given the demands and complexity of achieving the goals suggested by the social side, the requirements of those who teach and learn in vocational education have, perhaps, never been greater.

In some ways, the ever-increasing institutional measures to manage vocational education are both a statement about the potency of individuals' contributions and a testament to the perils of underestimating these contributions. No amount of external constraints and measures can ultimately control how humans think and learn (Foucault, 1986). Yet, institutions (e.g., governments) attempt to make vocational educational provisions teacher-proof and the detailed prespecification of what students will learn, and to disregard how individuals mediate what they experience and how they learn from those experiences (Valsiner, 1998). The provisions of detailed national prespecified outcomes, standardized content, and forms of assessment, which sometimes extend transnationally, and along with governance arrangements, including the imposition of competition

policy among institutions, are all attempts to control vocational education for what are primarily institutional purposes (Stevenson, 2001).

Perhaps there is nothing new or surprising here. Educational systems are usually established to realize the specific institutional purposes of church or state. Their continuity is equally shaped by forms of governance and institutional practices that aim to secure the purposes of their sponsors, usually governments (Skilbeck, Connel, Lowe, & Tait, 1994; see also Durham and Bragg, Chapter 12). Vocational education systems are no exception. Indeed, given their close associations with employability and the perceived ease of measuring their efficacy (e.g., graduate employment and employability), they are perhaps more subject to governmental expectations and scrutiny of such performance than other educational sectors (Stevenson, 1995). Seemingly, the more pragmatic the purposes, the greater the focus on their faithful realization (Jackson, 1993; Wärvik, 2013). All of these measures lead to circumstances that have an impact on both those who work and those who learn within vocational education systems. Yet, regardless of whether these measures are directed to such pragmatic purposes or the efficacy of learning experiences, achieving these purposes depends on those who enact vocational education and learn through them, as teachers (Vähäsantanen, Hökkä, Eteläpelto, Rasku-Puttonen, & Littleton, 2008) and students (Stevenson, 2005), respectively.

There are four reasons why positioning individuals centrally in discussions about vocational education is both salient and timely. First, as noted, vocational education arises from the social world, or what Searle (1995) refers to as institutional facts and Dewey (1916) as the "social side." Yet, its enactment and experiencing are also reliant upon what Dewey refers to as the "personal side." Therefore, it is necessary to account for the personal side (i.e., the contributions made by individuals and the nature and qualities of those contributions).

Second, there is a necessary interdependence between the social and personal sides (Billett, 2006a) that shapes human thinking and acting. It comprises the relations between institutional factors (e.g., norms, forms, and practices) and individual engagement with them, both of which are person- and situation-dependent by degree (Billett, 2009; Valsiner, 2000). Yet, given that learning is about change within individuals, these relations need to be understood from the perspectives of those who engage. Hence, accounting for and including their perspectives are essential. Proposed here is that this interdependence favors the social side in the institutional arrangements and the intended curriculum, but furthers the personal side in the enactment and experiencing of the curriculum.

Third, much of the research undertaken takes place within disciplines that privilege the social world. The starting point for many who research and theorize vocational education is the social side, meaning that their reach is either constrained or insufficient to account for individuals (i.e., the personal side). This includes accounts of how learners engage with the norms, forms, and practices that comprise social systems, particularly vocational education.

Fourth, the broad body of researchers whose interests are largely procedural and who focus on didactics and efficacy (i.e., understanding and improving the quality of vocational education) also seem ill equipped to address the complexity

of the relational character of individual engagement in vocational education, in particular the varying interdependence between the personal and social sides. In current accounts of vocational education, a focus on individuals and the duality that comprises their engagement with the social world is not adequately accommodated; it is an elaboration of that positioning and those relations that is advanced here.

Having outlined the premises upon which that case is founded, the chapter now discusses the origins of vocational education systems and their institutional purposes. Dewey (1916), in discussing the aims of an education sector associated with learning occupational capacities, proposed two specific purposes: identifying an occupation to become a vocation and developing the capacities to practice that occupation (see Taylor, Chapter 13). These are emphasized and aligned with his account of both the personal and social sides. Following on from this, the processes of vocational education and training (VET)—engagement in vocational education by teachers, students, and apprentices—are discussed in regard to the construct of the intended, enacted, and experienced curricula. As with purposes, the case here is that interdependence premised on dualities between the social and personal sides is required to understand these processes, but in ways that must be understood from the personal perspective. Interdependence is exercised relationally, but the social side is most strongly emphasized in the intended curriculum, whereas the personal side prevails in the enacted and experienced curricula.

Some Premises

In recent years, while elaborating how individuals learn the knowledge required for work across lengthening working lives, I have used the term *personal* in preference to *individual*. This preference has three distinct premises. First, the word *individual* attracts such negative responses that it often militates against reasonable and helpful discussion. It is often seen as a denial of social factors and often unquestioningly associated with contemporary accounts of liberalism and neoliberalism. Such is the orthodoxy within the current discourse to disallow, ignore, and contest the concept of individual that its use is often counterproductive. This term encounters such disaffection in contemporary scientific discourse that it becomes necessary to qualify its usage to an extent that detracts from the issue being discussed. This has been my experience of having work reviewed over two decades, particularly from journals based in and reviewed by academics from the United Kingdom. Moreover, this kind of privileging and its impact on the kinds of research published are what Fejes and Nylander (2014, 2015) have illustrated in the field of adult education. This is unhelpful. Instead of this term being a denial of the contributions, suggestions, and legacies of the social world, there is perhaps nothing more social than the individual (Billett, 2006a). What individuals know, can do, and value and how we view ourselves arise from the mediation of the particular socially derived experiences encountered across life histories (i.e., ontogenies). In essence, not only is the individual the epitome of

the social, but also individuals' learning and development are sociogenetic (i.e., what arises from the social world). Yet, despite making these points, as others have done (Harre, 1995; Valsiner, 2000), using the word *individual* remains counterproductive. The greatest resistance arises from those seeking to understand the social genesis of knowledge, yet whose disciplinary orientation seems to deny individuals' contributions to the social world. This is despite the likes of Foucault (1986) and Giddens (1991) supporting such premises.

The second reason for embracing the term *personal* is that what we experience and learn across our life histories is person-dependent (i.e., by degree personally unique); it shapes and is shaped iteratively through moment-by-moment learning (i.e., micro-geneses) (Rogoff, 1990) by our ontogenetic development. What we know, can do, and value come from earlier experiences (Valsiner & van der Veer, 2000). That development includes the dispositions that drive our intentions and actions and exercise our capacities (i.e., our personal epistemologies). There are also intrapsychological attributes (i.e., sensory, perceptual, and neural) that arise and manifest as a product of experiencing and maturation as shaped by the brute facts of nature (Searle, 1995) that arise in person-particular ways. Understanding about human cognition increasingly emphasizes the need to account for the interpsychological (i.e., between the personal and the social sides) and also the intrapsychological or intramental processes (Barsalou, 2008; Damasio, 2010; Iacoboni, 2005), as these encompass factors that are central to individuals' learning (i.e., personal factors). These factors extend to the personally shaped processes of cognitive, emotional, and physical maturation.

Third, conceptual accounts of relations between individuals and the world around them strongly emphasize factors that are person-dependent, such as the exercise of desires. Descartes (Cottingham, Stoothoff, & Murdoch, 1988), despite popular portrayals, rather than promoting dualisms, stated that although in principle there was a separation between the mind and body, in practice they are unified: The mind and body are "separable" in principle, but in fact they are in a "close and intimate union" (*Principles of Philosophy 1644*, Pt. 1, Sect. 48, I, pp. 208–209).

That union is central to the case Descartes makes in his final publication, *The Passions of the Soul* (1649). Subsequently, there has been a strong and consistent line of theorization about that union in terms of relations between people and the social worlds they inhabit (Billett, 2006a). The anthropologist Bateson (1972) noted that rather than generating similarity, cultural practices are made diverse through their enactment by people at particular places, in moments in time, and responding to specific circumstances. Dewey (1916), in the most seminal text on vocational education (Chapter 23 of *Education and Democracy*), referred to both the personal and social sides.

So, in responding to the editors' invitation to discuss VET and the individual in an essay for this volume, these three considerations are exercised when referring to individuals. They are (a) inherently related to and a product of the social world; (b) they are personally unique in some ways and central to any consideration of relations between social suggestions and individuals; and (c) vocational education is constituted and negotiated, by degree, in person-dependent ways.

Institutional Origins of Vocational Education Systems

Institutional facts were those that established, shaped, and have driven the form and direction of vocational education systems. Not surprisingly, therefore, public and governmental discussion about vocational education often emphasizes its institutions and systems and securing outcomes intended by governments, professional bodies, and industry and workplace interests (Aldrich, 1994; Bennett, 1938; Billett, 2011; Gonon, 2009a; Hanf, 2002; Wright & Allen, 1929). These emphases are often a product of deliberations and demands to address real or perceived imperatives. In the constant rounds of reforms and structural changes, such as attempts to standardize European education systems, it is salient to remember what these systems were designed to achieve. The mechanisms planned and enacted, and what outcomes, were often intentionally ordered in response to societal factors.

Scholars have delineated the complex of factors that shaped the initial purposes and form of vocational education systems, such as those in France (Troger, 2002), the Netherlands (Frommberger & Reinisch, 2002), and Switzerland (Gonon, 2002), and contrasts between the German and UK (Deissinger, 2002) and US (Gonon, 2009a) approaches. These factors variously included (a) the need for skill development in the absence of it occurring in the small and family businesses that were displaced by industrialization; (b) developing the kinds of skills that newly industrialized nations required; (c) engaging young people with and securing their allegiance and contributions to nation states; and (d) avoiding young people becoming unemployed and reliant on these states. One consequence of these factors was the entrenchment of vocational education within state bureaucracies. Beyond generating skilled workforces for newly industrialized nations, vocational education was positioned to play a number of roles in promoting orderly and educated societies (Gonon, 2009b). Over time, these imperatives have included responding to threats to the state from an emerging and potentially radicalized working class in the late nineteenth century, the need to compete with other and more advanced industrialized countries (Gonon, 2009b), providing education for large numbers of young unemployed males as a consequence of de-mobilization after the First (Gonon, 2009a) and Second World Wars (Dymock & Billett, 2010), and needing to address high levels of youth unemployment both before (Stow, 1847) and throughout the twentieth century (Frommberger & Reinisch, 2002; Troger, 2002). So, in France, Austria, Britain, and other European countries, vocational education provisions and systems were introduced, reformed, and progressively transformed by these institutional imperatives, that is, the purposes of the social side.

Moreover, the particular circumstances and historical moments across nation states meant these imperatives were manifested in country-specific ways. Not all provisions of vocational education are equally focused on developing the capacities required for specific occupations or specialisms. Moreover, in the USA, provisions of vocational education are far from being nationally consistent, yet subject to each American state's preferences (Labaree, 2011), which is also

evident in less extreme ways in Switzerland (Gonon, 2002), for instance. Here, the vocational education provisions were initially different across the German-, French-, and Italian-speaking parts of this country and as influenced by the cantonal system of Swiss governance (Gonon, 2002). Moreover, these imperatives can change dramatically over time. In republican France, the first provisions of vocational education were directed to soldiers' sons (Bennett, 1938) and were very much premised in work (Troger, 2002). Yet, the French republican sentiment subsequently sought to separate education from work, which resulted in a distinct approach to education in France that is oppositional to embedding it in work (Rémery & Merle, 2014), even in vocational education (Veillard, 2015).

Evident here, as in other countries, were key roles played by particular individuals in the formation of these systems. It was often the interplay between personal and societal factors that shaped how these individuals' initiatives were advanced. In France, the Duke of Rochefoucault-Liacourt's initiative to educate the sons of noncommissioned officers achieved national adoption and impact because of Napoleon's support (Bennett, 1938). In Germany, Kerschensteiner's ideas were buoyed by societal concerns about preparing young people for work and not being left behind in industrialization (Deissinger, 2002). The systematic approach to skill development pioneered by Della-Vos in the Moscow Imperial Technical School was similarly widely adopted because it was timely and well-received globally when demonstrated at the 1873 World Exhibition in Vienna (Bennett, 1938; Hanf, 2002). The distinctive qualities of the US vocational education system arose from a fascinating interplay between individual efforts and social factors. Despite being championed by Germany, apprenticeships were rejected in the USA early in the twentieth century as an educational provision for young people because of concerns about the capacities of US workplaces to support that mode of occupational learning (Gonon, 2009a).

When faced with the prospect of hundreds of thousands of soldiers returning from the First World War, however, a national debate ensued about what form American vocational education provisions should take. It centered on the degree to which it should be about specific occupational preparation or have general educational goals. The former was proposed by David Snedden in terms of social efficiency, and the latter by the philosopher John Dewey (Garrison, 1996). Despite the quality of Dewey's argument, Snedden's ideas were accepted by federal agencies because they were well-aligned with powerful industry lobby groups and their priorities (Garrison, 1990). Although Snedden was given a key role in implementing these reforms, they floundered because he insisted that two separate education systems were required: general and occupationally specific (Labaree, 2011). This requirement was resisted by the states, which refused to fund two separate systems of education, maintaining that their existing systems could be modified to accommodate both educational strands (Labaree, 2011). The community colleges system was created, which ironically provides a vocational education provision with an emphasis on general educational outcomes, consistent with what Dewey (1916) had proposed.

So, the origins, formation, and structures of vocational education systems, and subsequent changes, have largely arisen from institutional factors. Yet, those who participate in them ultimately shape considerations about how these systems and provision of education were established, and their continuity and

transformations. In seeking to understand how we should come to value the worth of vocational education systems and particular emphases and approaches, it is helpful to be aware of the purposes to which those systems are directed and the degree by which they emphasize either the social or personal side.

Purposes of Vocational Education

Any educational project should be purposive, that is, driven and guided by sets of intentions and purposes. It is these intents that shape the development of educational provisions, decision making about them, the selection of means by which these intentions are to be to realized (i.e., content), whether and by what degree students have learned what was intended (i.e., assessment), and judgments about the efficacy of these educational provisions (i.e., evaluation). As foreshadowed, there has long been an interest in the development of occupational skills (Bennett, 1938). This was accentuated and institutionalized in nations with the formation of modern nation states and industrialization both in Europe (Hanf, 2002) and elsewhere. Dewey was not the first person to use the term *vocational education*, yet he was prescient in elaborating its purposes in *Education and Democracy* (1916). He proposed two key goals (i.e., purposes) for vocational education: to (a) assist individuals to identify the occupation to which they are suited, and (b) develop the capacities to enact that occupation. If he was writing contemporaneously, he would doubtless have added a third: individuals sustaining their occupational competence across working lives (i.e., lifelong learning). Yet, in the purposes he stated, there is a strong emphasis on individuals' needs and capacities (i.e., the personal side).

In the first purpose, Dewey emphasized the importance of individuals selecting and coming to identify an occupation aligned to their interests and capacities, which would then become their vocation. There was a clear educational goal in assisting individuals with this task. He stated,

> An occupation is the only thing which balances the distinctive capacity of an individual with his [*sic*] social service. Nothing is more tragic than the failure to discover one's true business in life, or to find that one has drifted or been forced by circumstances into an uncongenial calling. (Dewey, 1916, p. 308)

He referred to Roman galley slaves to illustrate the point that the engagement of individuals in uncongenial callings was a waste of their capacities and interests both personally and societally. He proposed that the worth of occupational practices is what it means to those individuals who enact them and with which they come to associate. He emphasized this personal and social worth in two ways: the development of the individual and societal continuity. Yet, he placed the person at the center of these considerations:

> A vocation means nothing but such direction in life activities as render them perceptibly significant to a person, because of the consequences they accomplish, and are also useful to his [*sic*] associates. (Dewey, 1916, p. 307)

He then observed that the opposite of having a vocation is

> neither leisure nor culture, but aimlessness, capriciousness, the absence of cumulative achievement in experience, on the personal side, and idle display, parasitic dependence upon the others, on the social side. Occupation is a concrete term for continuity. It includes the development of artistic capacity of any kind, of special scientific ability, of effective citizenship, as well as professional and business occupations, to say nothing of mechanical labor or engagement in gainful pursuits. (Dewey, 1916, p. 307)

A salient distinction here is between occupations and vocations in terms of what they mean to individuals (i.e., the personal side over the social side). Occupations are institutional facts as they arise from society and the social world. But, these are subsidiary to personal facts in Dewey's view: What are they worth for the person (Higgins, 2005)? Indeed, drawing on Martin (2001), Dawson (2005) suggests that vocations are what we choose to engage with rather than what we *have* to do, and Rehm (1990) views vocations as personal callings. Occupations—their standing, form, continuity, and transformations— are shaped by the societal services they perform and, as human practices, are ultimately valued through what they mean to individuals. Occupations arise from the social world that grants them particular kinds of status, profile, and even the bases of decisions about their preparation (Billett, 2011). Vocations, on the other hand, are personal facts, that is, their importance is for individuals who ultimately assent to them being their vocations (Dawson, 2005; Higgins, 2005; Rehm, 1990). Individuals may be pressed to engage in occupations, as Dewey illustrates, but only they can make judgments about the worth of these occupations to them and whether they assent to them being their vocations. Hansen (1994) states that

> being a teacher, a minister, a doctor, or a parent would *not* be vocational if the individual kept the practice at arm's length, divorced from his or her sense of identity, treating it in effect as one among many indistinguishable occupations.… In such a case, the person would be merely an occupant of a role. This is not to say the person would conceive the activity as meaningless. He or she might regard it as strictly a job, as a necessity one has to accept, perhaps in order to secure the time or resources to do something else.… Thus, in addition to being of social value, an activity must yield a sense of personal fulfillment in its own right in order to be a vocation. (Hansen, 1994, pp. 263–64)

The emphasis on the personal side in Dewey's first educational purpose is salient contemporaneously, given: (a) the low retention levels in some courses (e.g., below 50% in some apprenticeship programs) and high turnover in some occupations; (b) the low societal standing of much of vocational education provision; and (c) the need to sustain workers' competence across lengthening working lives. Hence, although acknowledging the social side and its contributions, Dewey (1916) aligns vocations and the exercise of occupations as being

personal facts. He emphasizes the purposes of vocational education as being more than developing the capacities to undertake paid work (i.e., his second goal), but rather how individuals come to identify with their work, and direct their energies in undertaking and learning about their selected occupation. Another key distinction he makes between the personal and social sides is that individuals can simultaneously have a number of vocations (e.g., parenthood, an occupation, and hobbies). Beyond having this combination of vocations, the process by which individuals come to balance their interest in and action across them is person-dependent:

> We must avoid not only limitation of conception of vocational to the occupations where immediately tangible commodities are produced, but also the notion that vocations are distributed in an exclusive way, one and only one to each person. (Dewey, 1916, p. 307)

Across their lives, individuals engage in activities as shaped by interests, intentions, and vocations; this affects how they work and learn for occupational purposes. Individuals who are mobile and unconstrained, and able to dedicate themselves to their occupation, may make different decisions about their occupations from those who have family commitments and are constrained by time and location and/or have particular beliefs or preferences. The kinds of occupational paths, efforts to learn occupational capacities, and the need to sustain employability across one's working life are shaped by complexities of personal factors (Billett & Pavlova, 2005). It is these that become a calling, not as an external invitation, but as a focus for intentional engagement in activities and learning associated with working life. Dewey (1916) proposed analogously, "A calling is also of necessity an organizing principle for information and ideas; for knowledge and intellectual growth" (p. 309).

Hence, when initially forming an occupational identity and engaging in educational provisions and workplace experiences to acquire occupational capacities, there are important personal bases that act to sustain and transform those capacities across working life. Much is currently stated about lifelong education and its association with sustaining employability across working life. Yet, the vast majority of learning across working life arises outside of educational programs and is essentially mediated by individuals themselves. Therefore, this calling or vocation is central to directing and sustaining individuals' intentional process of learning (Malle, Moses, & Baldwin, 2001) across their working lives.

Personal and Social Dimensions of Educational Purposes

Beyond the two purposes for vocational education advanced by Dewey (1916), five other sets of purposes have been delineated (Billett, 2011). These are (a) cultural reproduction, remaking, and transformation of occupational practices; (b) economic and social efficiency and effectiveness; (c) societal continuity and transformation; (d) individuals' fittedness and work readiness; and

(e) their progression. Each purpose has particular qualities, yet they sometimes overlap. First, cultural reproduction, remaking, and transformation of occupational practices include the continuity, maintenance, and transformation of the occupational practices that are essential to countries, communities, and individuals. This includes an educational role in the transformation of occupational practices in response to changing societal concerns and emerging imperatives addressed by society, such as sustainability. These imperatives emphasize occupational practice arising from societal need (i.e., the social side).

Second, economic and social efficiency and effectiveness include developing capacities to sustain and develop particular industries and specific enterprises in their provisions of goods and services, meeting particular occupational requirements, and developing further the capacities required for continuity and expansion of enterprises. Of course, these concerns are more than a consolidation and pursuit of profit. These purposes extend to efficacy in the provisions of services such as healthcare and education and being able to perform with constrained resources, with again the social side predominating. Hence, vocational education can serve these purposes through effective initial and ongoing occupational development of skillful workers.

Third, societal continuity and transformation include reproducing societal norms and values, transforming practices, and developing the capacity of citizens to secure employment and avoid unemployment, meeting the educational and work preparation needs of particular cohorts. This includes securing the range of occupational competence that societies need, and contributing to citizens' education. Fourth, purposes associated with securing individuals' fittedness and work readiness include the following: identifying and guiding them toward occupations and careers in which they are interested and to which they are suited, developing an individual's capacities for occupations that suit them, and gauging and meeting student needs and readiness to work and learn as directed toward their preferred occupations. Educationally, this can comprise providing experiences in the world of work, and engaging reluctant learners in educational activities. Fifth, individual progression includes supporting individuals' development across working life, assisting work and occupational transitions, and supporting the development of learners whose needs and capacities transform across their working life (Billett, 2011). Many of these purposes for vocational education go beyond initial occupational preparation and emphasize learning across working life.

While taking the lead of Dewey in identifying those purposes that most strongly reflect either the social or personal sides, the following are suggested:

Purposes that comprise a predominantly social orientation:

- Developing the kind of capacities required by employers
- Developing the kind of capacities needed to sustain and develop further an industry sector
- Practicing that occupation in ways mindful of environmental and community concerns
- Developing the capacity to contribute toward national economic well-being
- Assisting workers to resist unemployment.

Purposes for particular individuals (i.e., the personal) are variously associated with:

- Understanding about work life and specific occupations
- Developing specific capacities to perform a particular occupational role
- The capacity to engage critically in the world of work
- Transforming the social practice comprising paid work or specific occupations
- Maintaining a capacity for lifelong employment (Billett, 2011).

These lists indicate purposes for vocational education that comprise goals of governments, communities, and workplaces. Yet, although these goals are generated by society, their realization is firmly premised in the interest, intents, and capacities of those who teach and learn in vocational education (i.e., the personal side). Inevitably, the development of understanding, the capacities required to perform occupational activities as set out here, the remaking and transformation of those practices. and sustaining employability across working lives are inevitably the products of effortful engagement in and learning by individuals. These outcomes are not just the product of the enactment of educational provisions, but also how individuals elect to engage with those provisions, learn from them, and apply them. As elaborated in the next section, the salience of learners' engagement with educational provisions is evident.

Processes of Vocational Education and Training

Having stated that educational provisions need to be intentionally guided by specific purposes, the processes that realize these purposes continue to be essential. They are, by degree, selected and shaped by individuals as they plan, teach, and learn through these processes. It is simply not the case that what is intended is implemented and learned with fidelity of those educational intents. Teachers draw upon their experiences, resources, and capacities in addition to what is available in the educational setting when selecting, ordering, and enacting experiences for their students in vocational education programs (Billett, 1995; Brennan-Kemmis & Green, 2013; Estola, Erkkilä, & Syrjälä, 2003; Vähäsantanen et al., 2008; Wärvik, 2013). Moreover, regardless of what experiences are afforded those learners in workplaces and educational institutions, what is learned arises through how they construe and construct those experiences (Dornan, Muijtjens, Hadfield, Scherpbier, & Boshuizen, 2006; Goller & Harteis, 2014; Stasz & Brewer, 1998; Wegener, 2014). Hence, learners' processes of experiencing (i.e., how they construe and construct what they experience) are central to the process and outcomes of vocational education. Personal epistemologies direct learners' engagement in and learning through those experiences. These epistemologies are more than beliefs (Brownlee & Berthelsen, 2006). They include what individuals know and can do, incorporating their embodied knowledge (Somerville, 2006), which is exercised without conscious intent. This includes their sense of self or subjectivity—how they

view themselves (Billett, 2006b); their agency—how they direct their intentional efforts in work and learning (Edwards, 2005); their intentionality—the focus and direction of the conscious efforts at work and learning (Malle et al., 2001); and also their introspection—how they engage mentally with what they experience (van Woerkom, 2003). Foundational personal practices include their engagement in mimetic learning (i.e., observation, imitation, and practice), and how they engage and learn from others is also central here (Gowlland, 2012).

So, regardless of whether referring to those who teach or those who are learners, these factors comprise the active processes of engagement and construction of knowledge: their comprehension of what they experience (Webb, 1999). That apprehending is premised on what individuals know, can do, and value; hence, the concept of readiness is salient. This is the degree to which learners have understandings and procedural capacities (i.e., skills) to engage effectively in these activities, all of which is underpinned by dispositional readiness (Billett, 2015). So, the degree to which individuals' values, interests, and dispositions are aligned with directing their efforts to learn the occupational practices is central. Individuals who perform exceptionally well in tasks often do so as a product of engagement in deliberate practice (Ericsson, 2006): They elect to intentionally practice to improve performance. Although this attribute is seen in professional sportspersons and musicians, it has broader applicability.

What has been proposed in this chapter delineates the central role of the personal in planning, enacting, and realizing the outcomes of vocational education provisions. Whether they are teachers, administrators, or students, individuals bring particular capacities and interests to the provision of vocational education, and how and what learning arises from these. To elaborate the central role that individuals play in vocational education processes, the next section discusses how these influence what constitutes curriculum in terms of its intentions, its enactment, and how it is experienced.

Vocational Education Curriculum Development, Enactment, and Experiencing

Conceptions of curriculum and their role in vocational education need to be understood as something proposed by their sponsors (i.e., the intended curriculum); something implemented by people such as teachers, trainers, and workplace supervisors (i.e., the enacted curriculum); and something experienced by those who participate as learners (i.e., the experienced curriculum). What is intended and enacted is shaped by available resources, expertise, and circumstances that in combination comprise elements drawn from both the social and personal sides. Yet, perhaps the most important conception of curriculum is how students come to engage with and learn from what is enacted: the *experienced curriculum*. This third conception of curriculum is particularly central to the project of vocational education. Although these three conceptions are common to all educational sectors, vocational education is particularly centered on what its intentions and enactment mean to students (i.e., their vocations).

Together, these three conceptions of curriculum offer bases to understand the processes of vocational education. They also offer a means of illuminating how the different sets of social and personal contributions are positioned interdependently.

Intended Curriculum

The intended curriculum is exactly that: what is intended by its sponsors or developers and should happen as a result of the curriculum being implemented as intended. These intentions are rendered real and tangible by planning and/or consultation processes that often result in the production of a document (e.g., syllabus, national curriculum document) that states the educational aims and goals (and often objectives) to be realized. Sometimes, these documents declare in great detail what should be taught, how it should be taught and also assessed, and to what standard (Marsh, 2004; see also Hager, Chapter 4; Wheelahan, Chapter 6). These documents usually reflect stakeholder interests, which in vocational education are typically the voices of industry, professional or occupational bodies, and sometimes employee unions. Often, the intent of such documents is more to direct than guide how these programs are to be implemented. Administrators and teachers of vocational education are expected to implement what the stakeholders intend (Billett, 2011). In the growing and often intense interest that national governments display toward mobilizing vocational education as a means of realizing important economic goals, the intended curriculum in the form of detailed syllabi and associated administrative processes has become a key focus of governmental concerns (Stevenson, 2001). It is seen as a means by which these intents can be realized with certainty, through teacher-proofing the educational provision (Stevenson, 2001). Such regulatory measures have been used globally, regionally, and nationally by supranational, state, and local agencies to manage the enactment of vocational education, variously through national industry competency standards, accreditation procedures, open-tendering, and so on.

Such measures aim to secure a uniform implementation of national curricula and the realization of prespecified outcomes. A key objective is to wrest control of the educational provision from vocational education systems and teachers, and transfer it to industry through processes that are responsive to industry needs (Skilbeck et al., 1994). Such measures are expected to result in what was being enacted and learned being closely aligned with what government and industry intended. The belief is that regulation and prescription can control what is taught and what is learned by students. Hence, emphases are placed on managing the learning experiences and outcomes through prespecifying and mandating student experiences and outcomes through the intended curriculum. Such efforts and focuses on the intended curriculum address the social side while ignoring or denying the personal side of educational processes.

The "intended curriculum," however, includes the experiences that teachers plan for their students. This is particularly true when those who teach are in a position to shape or even determine some or all aspects of the curriculum's intent and content. The school-based curriculum development model

(e.g., Skilbeck, 1984) affords teachers such discretion. In some countries and vocational education systems, localized arrangements are practiced (e.g., Germany). The discretion afforded teachers in these circumstances is based on a view that they are best placed to make judgments locally about particular kinds of needs (e.g., workplaces and students) and respond appropriately to them. In systems that are not highly regulated, teachers are required to develop both programs and learning experiences to meet those needs (Sahlberg, 2012). More than making decisions about enacting what others have decided, teachers contribute to designing the intended curriculum through exercising their particular contributions. This requires teachers to be skilled and proficient in designing and selecting what is implemented (Skilbeck et al., 1994).

Thus, the social side of the educational process is often strongly expressed in the intended curriculum as directed by national and sometimes supranational imperatives and mechanisms attempting to control and administer student learning. So, the discretion of teachers in local planning and preparation suggests that it is necessary to express the personal side. Yet, in a curious way, the fact that these administrative and regulatory arrangements are being enacted acknowledges the power of the personal side, which needs to be controlled and managed. These factors are indicative of the roles played by the personal side in the enacted and experienced vocational education curriculum.

Enacted Curriculum

The enacted vocational education curriculum comprises what is implemented: the provision of experiences for students. That enactment is shaped by available resources, teachers and trainers' experience and expertise, their interpretation of what was intended, their values, and the range of situational factors that shape what experiences are provided for students. Many vocational educators have extensive competence and experience in particular occupational fields. These capacities have developed across their working lives and influence how they select content and make educational decisions, including particular emphases and teaching orientations. This does not always coincide with what is anticipated in curriculum documentation or syllabi. In my own case, I came to vocational education with a long history of work in the garment-manufacturing industry, which was part of the rationale to recruit me as a vocational educator. Yet, I was confronted with course content that was not aligned with industry needs, and neither were the adopted approaches to pattern making and garment production. I relied on my pattern-making and garment construction skills in deciding what I would teach, what was important for students to learn, and how it might best be implemented. So, rightly or wrongly, despite having a detailed syllabus prescription, what I taught was at variance with the prescribed approach. Moreover, through interactions with other staff members, it became evident that even when "same content" was being taught and different approaches were being taken, distinct experiences were being provided for students. Hence, decisions about what to implement and how were being made based upon individuals' personal experience and preferences. In research shadowing implementation of initiatives within vocational education, similar negotiations have been reported (Baverstock, 1996; Billett, 2000; Vähäsantanen et al., 2008).

Beyond the capacities of teachers and available resources shaping the activities undertaken in educational institutions, other factors influence the enacted curriculum. These include the kinds of workplaces or practice settings that are available to students, where students can find support and guidance, and access to particular kinds of experiences. For instance, distinct opportunities are available in metropolitan, regional, and remote communities, and they shape the kinds of experiences students can have in each setting. The "enacted curriculum" also includes part of the "hidden curriculum"—that which is not consciously intended by teachers, but happens anyway. It seems important to understand and account for factors shaping the "enacted curriculum," as more often than not there will be differences between what was intended and what is implemented. These differences are perhaps at their greatest when elements of the intended curriculum (e.g., the syllabus) are developed in circumstances remote from the teachers who will enact what is intended by sponsors and others (Billett, 1995). Industry and governmental representatives may agree on what is required for their purposes, and capture these in curriculum documentation. Yet, without engaging with those who are to implement the curriculum, what transpires may be quite different from what is intended. Of course, there is a longstanding and legitimate role for those who are not teachers to shape what should be taught. Teachers have no historical right to exclusive influence on the intended or enacted curriculum (Skilbeck, 1984). However, unless they are engaged with in processes of planning and preparation, it is unlikely that the demands of external stakeholders will be understood, accepted, or vigorously engaged with by teachers.

As noted in this chapter, within vocational education there have been attempts to control the "enacted curriculum" by use of regulatory measures and procedures that aim to ensure that the intents are enacted with fidelity. However, even the most strenuous attempts at uniformity and conformity with implementation are unlikely to be successful unless those who enact them both understand and concur with these intentions (Print, 1993). In this way, what is enacted in terms of experiences for learners is as much, and perhaps far more, premised upon the available resources, teachers' capacities and beliefs and expertise (i.e., the personal side), and student characteristics, compared to what is stated in a document (i.e., the social side).

So, as discussed, individuals as teachers and administrators play key roles in the enactment of vocational education provisions and programs. However, in terms of student learning, beyond what is enacted, the most important aspect of curriculum is that addressing what students experience and learn from what is intended and enacted.

Experienced Curriculum

The *experienced curriculum* is what students experience when they engage with what is enacted, regardless of what was intended or implemented. Students do not experience a syllabus document or national standard. For those particularly interested in student learning and development, this is the only plausible definition of *curriculum* (Dewey, 1916; Smith & Lovatt, 1990). If student learning is the most salient concern for educational provisions, ultimately the principal focus needs to be on the experienced curriculum: what and how students construe and

construct (i.e., learn) through experiencing vocational education. Higgins (2005) proposes that for Dewey, the true provision of vocational education is achieved only when learners are engaged in learning processes that have relevance for them. Beyond emphasizing the democratic essence of education, this includes supporting a learner's ability to make moral and rational choices based on an ability to act autonomously as a unique person (Quicke, 1999). This view is also supported within the broad spectrum of constructivist accounts of learning. It places learners at the center of educational processes, and as being more than subjects or objects, but as active agents in those processes. Individuals are active meaning makers, not merely the unquestioning recipients of stimuli from elsewhere, as behaviorists once argued. Dewey (1916) proposed that curriculum is grounded in the activity and interrelationships of persons. This is a view of the curriculum as an interaction between learners and the world as it is suggested to them and how they experience it. What was intended as a group learning experience may result in a group encounter characterized by the domination of just a few. For some students, this experience will be all about the manifestation of power in a group situation and the frustration of those whose ideas were marginalized, whereas others may have learned about how to organize and advance their ideas.

Consider also the differences in learning experiences enjoyed by students engaged full-time in educational institutions versus apprentices who spend the majority of their time in workplaces. Unlike apprentices, college-based students may never experience workplace tasks that require them to utilize the knowledge they are learning through their courses. Nor may they have the opportunity to learn vocational skills through engaging in workplace activities. Both the prior and immediate experiences of these two different kinds of learners suggest the bases of their experiencing will render their pathways of vocational skill development quite distinct (i.e., one based in the college, the other largely in the workplace). More fundamentally here, the bases upon which these learners might construct what they experience are very different for engaging in and learning from the vocational education they experience. The assumption that individuals simply accept suggestions from the social world has been refuted by a range of scholars within different disciplines. Instead, individuals are held to construe meaning and construct knowledge on bases that arise from their prior experiences and learning, which in turn leads to their person-particular ontogenetic development. This construal and construction are referred to by Valsiner and van der Veer (2000) as their cognitive experience. Others have suggested analogous concepts to explain the process of human meaning making. Also, accounts from philosophy (e.g., Lum, 2003), cultural psychology (Valsiner, 2000), sociocultural theory (Wertsch, 1993), and sociology (Giddens, 1984) all propose in consonant ways that individuals' engagement with suggestions of the social world is premised upon what they know, their bases for knowing, and their previous experiences. Hence, there can be no certainty that what is planned or enacted will indeed be that which is learned. For instance, even the pedagogic strategies used in vocational education might generate quite different student engagements and outcomes (Posner, 1982). Consider the self-paced and independent-learning opportunities that vocational students may encounter.

These experiences may meet the needs of some, but not all, of the learners. For some students, these experiences provide an opportunity to excel; for others, who are less ready, these demands go beyond what they can achieve without assistance.

Hence, the learning that arises through vocational education is a product of what and how students experience what has been implemented. What constitutes the "effective curriculum" resides in what students experience as well as what is implemented. Ultimately, it is students who decide how they engage with what is provided for them in educational programs or courses or in other settings, such as workplaces. So, the decision making that constitutes the experienced curriculum arises from the personal preferences, experiences, and capacities of those who are positioned as learners (e.g., students, apprentices, and workers). All of this emphasizes the central role of learners in the provision of vocational education. Yet, how often are their voices included in processes that lead to the development of the intended curriculum?

Conclusion

As advanced across this chapter, it is not possible to account for the purposes, processes, and outcomes of vocational education without a consideration and elaboration of the role of individuals. As has been proposed, beyond their contributions (i.e., the personal side), it is necessary to account for the individual in relation to the social side. This relationship is necessary and cannot be subsumed within a consideration of institutional factors and societal practices and suggestions. Moreover, the centrality of the individual in these relations is central because they are the meaning makers. Emphases on the personal and social side differ across the intended, enacted, and experienced curricula. The central role of the social side is evident in the formation of vocational education systems, their institutions, and their practices, which are used to organize and manage their enactment. In this conception of curriculum, the mediating power of the social world is evident in the degree to which individuals' efforts and innovations are accepted, or rejected, as is instantiated in the outcomes of the debate between Sneddon and Dewey about the kind and character of the American vocational education system. With the enacted curriculum, the key role of teachers as decision makers in selecting, ordering, and enacting student experiences comes to the fore. From this conception of curriculum arises the interplay between social and personal sides, as situational factors and teachers' preferences and discretions play out in the implementation of educational provisions. Yet, it is within the experienced curriculum that the personal side is central. Ultimately, the social side is nothing more or less than suggestions that individuals can accept or reject by degree. Eventually, the legacies of vocational education are found in how learners elect to participate in and learn from what is afforded them in vocational education programs.

Hence, accounts referring to the purposes, processes, and practices of vocational education that fail to acknowledge and accommodate the individual (or personal) dimension on its own terms and in relation to the social side will always

remain incomplete and unconvincing. Ultimately, there is nothing particularly novel in what is proposed here, as it builds upon key ideas that were first raised by Dewey a century ago, when he set out many of the premises that shape how we now consider and come to value vocational education. Central here is the need to accommodate both the social and personal sides of factors informing this important educational sector. Here, my attempt has been to re-emphasize the personal side, which may have become downplayed or, worse, still ignored in recent times.

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4

VET, HRD, and Workplace Learning: Where to From Here?

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Introduction

The focus of this chapter is an examination of key developments since the second half of the twentieth century that have significantly affected vocational education and training (VET). It will be argued that whatever benefits might have accrued from the adoption of competency-based training and neoliberal market models of VET delivery, in practice these initiatives have had significant deleterious effects on the quality of VET (see also Chapter 6). This introductory section will consider briefly some perennial VET themes and issues that relate significantly to these twentieth-century developments. Appreciating how the current low point of VET is tied in with these perennial themes and issues will demonstrate that the current deficiencies are not insuperable—there is a way forward.

VET, when conceived as preparation for work, has undergone many changes across human history, including significant changes to its perceived scope and purpose. In the millennia prior to the establishment of more formal arrangements (which really took hold in the late nineteenth century), VET centered on *on-the-job mentoring* as novices and their more experienced elders engaged in productive work activities. The beginnings of more formal VET arrangements can be traced to various trade guilds and skilled occupations prescribing the performance standards to be achieved by on-the-job learning. However, it was the Industrial Revolution, from the mid-eighteenth century onward, that created the major impetus for VET to become a significant component of state-operated formal education systems (Herrmann et al., 1976; Malley & Keating, 2000). This key development occurred, of course, much later in emerging nations. It should be noted that the wide diversity of VET arrangements across different nations, and even across different regions and states within one nation, means that this chapter cannot do justice to the particularities of any given nation, let alone its regions or states. It is acknowledged that the broad twentieth-century trends that

are the main focus of this chapter played out somewhat differently in different nations. However, as the relevant literature shows, the main trends and issues discussed in this chapter are relatively universal.

Various key features of the Industrial Revolution are very relevant for understanding VET's development in the twentieth century. Mechanization, while rendering some human skills obsolete, also creates new kinds of work and new kinds of skills. This trend for new technology to deskill some types of work while simultaneously creating new forms of work, some of them highly skilled, has continued unabated into the twenty-first century as microelectronic technology has colonized the workplace. But the creation of new skills is but one factor in the greatly increased demand for formal VET. The sheer size of emerging industrial organizations fueled unprecedented demand for administrative and clerical employees in an era when minimal participation in schooling had been the norm. VET was the obvious candidate to deal with these pressing skill demands. This initiated what became a perennial role for VET: to alleviate government embarrassment by providing quick-fix "solutions" to labor market crises.

By the early twentieth century, the number of specialist occupations requiring formal qualifications had increased greatly, as would the number of different levels of qualifications within a broad occupational field. Thus, VET's remit expanded to cater to occupational levels both above apprenticeship level (e.g., technician, advanced trade) and below it (e.g., diverse "semiskilled" occupations). The scope of the term *technician* is, of course, more complex than this brief outline might suggest (Hermann et al., 1976). As occupational levels multiplied, there was a distinct shift away from VET's traditional apprenticeship-inspired focus on on-the-job learning toward a more academic model of teaching and learning. For the majority of VET courses, on-the-job learning was displaced by classroom learning in conjunction with relevant practical activities normally conducted on VET premises. The latter activities were, at best, a pale imitation of actual workplace practice. The result was that only two major occupational levels still featured on-the-job learning as their main focus: apprenticeships and so-called "unskilled work" (Parnes, 1962).

Another highly relevant theme is the diverse and changing purposes of VET. Throughout most of its history, the purpose of VET remained obvious and stable: to induct the next generation into the skills and practices required to achieve a living. However, the rise of *formal* VET saw its purposes multiply as governments took more control. Even in the early decades of formal VET, it was a truism that specific occupational skills should be learned on the job. Thus, formal VET initially sought to supplement on-the-job occupational learning with more general education offerings designed to make workers into better citizens. However, this focus soon changed dramatically as the economic benefits of a well-organized government-run VET system became paramount. VET increasingly became a favored government mechanism to mitigate pressing policy problems, often on a short-term basis. Clearly, sound VET arrangements can effectively address skill shortages, but too often the desire for a quick fix has led to ineffective "solutions" to problems. For instance, compulsory placement of unemployed youth into hastily conceived special VET programs that, while improving youth unemployment statistics, do not lead to employment is highly dubious.

Over time, there has been a distinct shift in the purpose of VET, from serving the needs of citizens toward meeting political, economic, and industrial priorities. True, there have been occasional times of prosperity when governments have promoted high participation in VET as itself a societal good. However, as the globalization of the world economy has gathered pace, there has been a narrowing of VET offerings in order to focus almost exclusively on immediate workplace needs. This trend has been accompanied by a gradual shifting of the costs of VET from government and industry to the consumer. The result has been that by the end of the twentieth century, there had been a distinct narrowing of the purposes of VET.

This section has highlighted two main perennial themes that have strongly shaped VET from the second half of the twentieth century: first, a move away from on-the-job learning toward more academic modes of learning; and, second, a shift of purpose from developing individual learners toward meeting economic and industrial priorities. The remainder of this chapter will argue that these two trends are actually in conflict with one another.

Developments Since the Second Half of the Twentieth Century That Have Significantly Affected VET

During the 1970s, human resource development (HRD) became the favored mechanism that companies and organizations deployed in order to maximize their productivity and efficiency (Swanson & Holton, 2009). The cry was that any organization's employees were the most valuable resource that it possessed. Thus, in an increasingly changing world, it became the responsibility of organizations themselves to ensure that their staff received the kind of forward-looking, up-to-date training that would support the continued flourishing of their business. In effect, this was a trend toward organizations accepting that they had responsibility for some aspects of VET, namely, the ongoing and emerging training requirements that would enable the organization to perform optimally in its changing environment. Common themes in HRD programs were the need to build more effective teams and the need to better understand the changing environment in which the organization was operating. Thus, HRD centered on improving the work performances of both individuals and groups within the organization, while at the same time recognizing the importance of adult learning principles. This development also recognized that generic VET offerings, designed to cater for all-comers in a particular occupational field, were not, by themselves, enough to prepare workers to handle contingencies specific to a particular organization.

This type of in-house VET offering became widespread as large and medium-sized organizations set up their own designated HRD departments. Typically, HRD departments were charged with delivering short programs of training that would improve the performance of both individuals and groups within the organizational setting. The aims were to make individuals more proficient at their current job, identify and foster their potential for other jobs in the organization, and encourage better teamwork. All of this was in the hope of making the organization more efficient, responsive, and productive. Although this type of

VET was focused on organization or company-specific matters, it might also have resulted in learning that could prove to be useful elsewhere. Also, it created opportunities for external VET providers to offer tailor-made short training programs on a fee-for-service basis.

However, as HRD departments became firmly entrenched in organizations, questions began to be raised about whether their costs outweighed the benefits that they delivered. The major problem seemed to be that in too many cases, these "in-house" programs were being delivered in locations well away from the workplace. This was particularly true of programs intended to develop staff at higher levels. Although such programs typically generated short-term staff enthusiasm and goodwill, the common experience was that these effects diminished quickly as workers returned to their standard work routines. There seemed to be little direct evidence of transfer of the learning. No doubt part of the problem was the fact that, as development programs were increasingly delivered away from the workplace, the program developers and presenters were less and less likely to be familiar with the actual workplace contingencies faced by the staff who they were supposedly developing. Swanson and Holton (2009, pp. 146–160) present this important issue as an ongoing tension within HRD: between a "learning paradigm" and a "performance paradigm," or between whether serving the individual worker or serving the organization should be the primary focus of HRD.

Clearly, then, the problems here are more complex than just the simple issue of generic versus specific training. There is little doubt that even though many staff development initiatives served to foster staff motivation and camaraderie, any lasting long-term impacts were difficult to quantify. In most cases, it turned out to be unrealistic to expect improvements in daily workplace practice unless the developers themselves had relevant expertise in the workplace practices that they were seeking to enhance. Indeed, in many instances, far and away the most plausible candidates for possession of the relevant expertise and experience were middle-level or line supervisors of the staff targeted for development.

The result was that, by the end of the twentieth century, there had arisen a strong trend to abolish or pare back HRD departments. In their place, there was a shift toward immediate supervisors being responsible for training and mentoring those under their charge. This reflected an increasing trend toward flatter organizational structures. It also indicated a growing recognition of the importance of learning from and during actual workplace practice, as against the then-common HRD approach of learning elsewhere and applying it later in the workplace. Of course, as the apprenticeship model reminds us, quality training and mentoring from an immediate supervisor require supervisors to be well trained and to have the time and resources to carry out this important, but for many novel, dimension of their work role. This important point will be discussed further as this chapter progresses.

At the level of nations and states, the mid-twentieth-century counterpart to HRD was manpower planning, sometimes called human resource planning (names now clearly out of date). Manpower planning was characterized as a process to assure that trained workers would be available and ready, in both numbers and disciplines, as and when they were needed. Whereas large organizations typically engaged in planning their own future workforce needs, governments saw their role as seeking to plan for future workforce requirements

at the national level. The key concept here was that the workforce as a whole should be viewed as a national resource to be developed carefully so as to meet present and future national skill needs. The basic idea was to limit entry into occupations with an oversupply of applicants and to provide incentives to meet the required numbers in areas of undersupply.

However, experience soon showed that so many variables were involved here that could change unpredictably in the short and medium terms, that accurate forecasting of human resource requirements has remained a considerable challenge (Evans, 1971). As the world has become increasingly globalized, forecasting years ahead the specific human resource requirements of a given nation has become even more fraught. Paradoxically, in an increasingly interconnected world, the relevant factors that underpin any reliable forecast are increasingly unknown or, even, unknowable. Part of the problem is the common phenomenon of occupational slippage (i.e., the important fact that not all graduates of an occupational program enter the occupation for which they have been prepared). Many law graduates never practice law. Not all apprenticeship completers remain in the occupation in which they served their apprenticeship. Australian research, for example, found that for the years 2008 and 2010, 72% and 70%, respectively, of those completing an apprenticeship were employed in that occupation nine months later (NCVER, 2010, p. 13). However, the extent of the occupational slippage varied significantly with the ages of the apprenticeship completers. Of those aged 19 and younger, nearly half had moved to a different occupation, whereas the slippage was about one in five for the older age groups. A further confounding factor for forecasting future job number requirements is the phenomenon of occupational shifts. Increasingly, workers are inclined to move from one occupation to another several times during their working life. Thus, many individuals in VET programs are typically either looking to move from their present job into another occupation or looking to their study program to keep them abreast of changes within their present occupation. Quantifying the extent of occupational shifts is far from simple. Collecting data on how often people change *jobs* is relatively straightforward, but when is job change also a change of occupation?

What are the main conclusions about developing and maintaining a skilled and proficient workforce that can be gleaned from this section? It seems that ongoing staff development and learning processes ideally should be closely tied to actual workplace practice and experience. This, of course, reflects one of the perennial VET themes identified earlier in this chapter: Well-organized on-the-job learning is preferable to more academic learning modes (which were often employed by HRD departments). However, characterizing actual workplace practice and experience is more complex than it first appears. We turn now to competency-based training, a technology that was intended to capture actual skilled practice but failed badly in the attempt.

Competency-Based Training (CBT)

Many nations over the last 20 years or so have adopted competency-based training (CBT) as a way to supposedly streamline and improve their VET system. However, this international trend has been far from uniform either in the ways

that it has been implemented or in the kinds of results that such implementations have achieved. These different outcomes between nations reflect differences in such things as the motivations for changing VET arrangements and the time-frame and scope of the changes. By far, the most significant differences stem from variations in how the notion of competence itself is interpreted. These different understandings of competence have yielded very different versions of CBT and its implementation. A detailed account of the actual differences across nations is beyond the scope of the present chapter. However, it is accurate to state that nations such as the UK and Australia, which favored a fairly narrow understanding of competence, far from enhancing their skills formation systems, have arguably achieved the opposite (Hager, 2004; Hyland, 1994; Stokes, 2017). In contrast, some European nations with a history of highly respecting and nurturing skills formation have interpreted competence in ways that have not adversely affected their skills formation systems (Mulder, 2014; Weber & Achtenhagen, 2017; Weigel, Mulder, & Collins, 2007).

Differences in the motivations for implementing CBT are illustrated by the case of Australia. Unlike the top-down approach of some other nations, Australia's adoption of CBT to supposedly reinvigorate its VET system was a tripartite initiative of government, unions, and employer organizations in the late 1980s, inspired by the need to remain economically competitive in an increasingly globalized world. The centerpiece of this initiative was the adoption of CBT for all VET courses, whether offered by TAFE or through private provision (TAFE stands for Technical and Further Education and is the government-owned arm of Australian VET).

Unfortunately, CBT as it was widely understood during its implementation in Australia centered on a very narrow understanding of competence, one that assumed that the practice of an occupation is reducible to a set of discrete competencies (Cairns & Malloch, 2017; Hager, 2004). Once trainees had demonstrated satisfactory performance of each of these competencies, they were deemed to be competent practitioners. Too often, assessment of competence became mere ticking off of a checklist of discrete competencies. In extreme cases, the checklist of discrete competencies was assumed to exhaust the curriculum. These deficiencies point to several problems that commonly arise within CBT systems. First is the tendency to fragment expertise into isolated skills, while overlooking the fact that proficient performance primarily requires a holistic integration of the skills so as to deal with the needs of the particular situation. Second, the focus on isolated skills encourages course delivery modes in which each skill becomes a separate detachable module for teaching and assessment purposes. Thus, in the name of efficiency and ease of assessment, the holistic essence of actual skilled performance is missed out completely.

This approach to judging and credentialing competence is invalid. It represents skilled performance in an overly simplistic way because the sum of the discrete parts does not in itself constitute the whole. Any convincing account of skilled performance requires a degree of holism, as the following easily understood example demonstrates. Consider what is necessary for skilled driving of a motor vehicle. We can easily identify a set of discrete skills (starting the ignition,

making a 90 degree right turn, applying the foot brake, etc.). Suppose that we had identified a complete list of motor vehicle driving skills (say, 60 of them). Suppose further that a learner demonstrated that they could perform each of these 60 discrete skills. Would it follow that we should certify them as a skilled driver? Clearly not—skillful driving involves more than being adept at each of these discrete skills. There is no contradiction in the claim that someone is adept at each of these discrete skills yet is still a very poor driver. Skillful driving involves something more: the capacity to enact a holistic driving performance that matches the particular road and traffic conditions and many other circumstances that obtain at a particular time. So, the real skill of driving resides not so much in having the discrete skills as in the capacity to put them together in effective combinations that meet present conditions. This holistic capacity is underpinned by less tangible "competencies" such as perceptual discrimination, persistence, attention to detail, planning ahead, judgment, and so on. It encompasses simultaneously and holistically cognitive, bodily, and affective attributes, rather than treating them as independent, discrete entities.

Thus, genuine competence incorporates a vital holistic dimension that eludes CBT checklists. Since the implementation of CBT in Australia, there have doubtless been many able VET teachers who understood these matters and incorporated them into their teaching, while at the same time paying lip service to the prescribed CBT framework. However, the system as a whole has continued to present CBT as the model of sound vocational preparation.

In contrast to this gloomy depiction of Australian VET, it is worth noting that since the 1990s, most Australian professions have also adopted a competence system, but one that is very different from CBT—one that might be called *competence-informed professional education.* Here, the competence statements, which attempt a rich description of key aspects of professional practice, are employed holistically. This plays out in several distinctive ways. One is that any slice of actual professional practice will simultaneously involve several of these key aspects. Thus, assessment activities are required to focus on selected slices of actual practice, rather than on the key aspects of professional practice (the equivalents of the CBT checklists) taken one by one. Another clear principle is that the competency statements are not to be confused with a curriculum, as too often happens in CBT. Furthermore, it is stressed that professional practice is a whole that cannot be captured comprehensively in the competency statements. For example, competency statements cannot account for crucial tacit aspects of practice. Nevertheless, this integrated competency approach has proved to be a very useful tool for enriching understanding of the holistic nature of actual practice situations. It also provides very useful input into a variety of activities for which professional boards and associations are responsible, such as judging applications from prospective migrants to practice in Australia, accrediting tertiary courses, designing refresher courses for professionals returning to practice after years of absence, and so on (Hager, 2017). The vital point that diverse understandings of competence can make a big difference in how a competency-based system is implemented is thus well illustrated by the very different cases of the VET sector and the professions in Australia.

Effects of Neoliberal Economic Agendas

The deficiencies in CBT have been magnified further by a simultaneous significant growth of private VET provision. Once again, these developments were supposed to improve the efficiency and effectiveness of the VET system, but in practice they have turned out to have major deficiencies. The growing impact of globalization on national economies has meant that, increasingly in recent decades, VET has been shaped and reshaped by neoliberal economic policies. Major effects, all intended to minimize costs to government, have included the following:

- A narrowing of VET program offerings to focus on more immediate workplace needs
- The setting up of markets in which various VET providers, often some public and some private, tender against one another for the right to offer certain programs
- Shifting more of the costs of VET away from government and industry to the consumer, by significant increases in course fees.

CBT is, of course, the prime example of the first of these effects. Although most VET systems feature a mix of public and private VET provision, the second of these effects has played out somewhat differently across nations. For instance, the UK and Australia have had strong public provision, whereas the USA has featured much more private provision, although the extent of this varies somewhat across the country. Likewise, the ratio of public to private provision has also fluctuated over time within nations. However, the introduction of competitive tendering, particularly in the neoliberal era, has generally served to greatly increase the number of private providers in the marketplace. Between 2009 and 2013 in Australia, the number of publicly subsidized students enrolled in private provider courses more than doubled, whereas in the same period, the number enrolled in the public TAFE system dropped by about 10% (NCVER, 2015). There has always been a tension in VET between providing high-quality training and working within budgetary constraints. For public providers of VET, it is often a challenge to keep these opposing forces in balance. However, although doubtless some private VET providers have motivations that ensure a commitment to delivering quality training, others are more focused single-mindedly on maximizing profits.

In Australia, the increasing practice of allocating VET funding via competitive tendering between TAFE and private providers has greatly intensified the pressure to resort to the most minimalist versions of CBT. Even VET providers who are motivated by strong educational considerations have been squeezed into lowering their aspirations, as they also need to cover costs.

At the same time, governments in Australia and elsewhere have greatly increased the cost of VET qualifications and instituted a system of repayable loans to encourage student demand. This has led to a flood of unethical and fraudulent activities in the VET sector, as youngsters desperate to find a rewarding career are lured into signing up for dubious vocational courses. Australia has seen a growing number of large private VET providers going into receivership

after having absorbed significant public funds, yet leaving their students without the contracted training. There have been many clear instances of unethical and fraudulent student recruitment practices (for detailed accounts, see Senate Standing Committee on Education and Employment, 2015).

It is also significant that the move toward more private provision of VET in Australia has in some respects served to limit the range of courses available. With the profit motive as their main driver, private providers will favor the kinds of courses that will most readily yield a profit on their investment. Hence, it is unsurprising that private VET provision in Australia is skewed toward broader, more generic offerings as against more specialist, skills-oriented occupations that would require significant resource-intensive teaching and equipment. The result is that some apprenticeship and other high-skills courses, ones that require well-qualified teachers with extensive practical experience as well as elaborate training facilities and equipment, are difficult to access. Even TAFE, once the mainstay of such resource-intensive courses, is loath to take on such high-cost offerings as it battles to compete with private providers for funding.

In short, using the profit motive to drive VET provision has proved to be counterproductive in relation to achieving quality skills formation. What stands out starkly in the catalog of deficiencies of the current VET system, as discussed here, is the complete absence of any reference to *curriculum*. As noted in this chapter, there is a prevalent tendency among many VET providers to view the checklist of competencies or skills as being the curriculum. But even richer competency descriptors than CBT ones (such as the integrated approach employed by some professions that was discussed in this chapter) are still describing the *outcomes* of learning. That is, they describe the capacities that a novice practitioner should be able to demonstrate. However, properly understood, a *curriculum* is something else again (as its Latin derivation of "course to be run" suggests). What a curriculum does is to outline a sequence of suitable learning activities that, when followed through, will result in novices developing the required capacities. Thus, the notion of curriculum focuses attention on a program of learning activities, together with the kinds of resources (human and other) that will enable successful learning. In short, curriculum refers to a *process*, whereas competency standards capture a logically different kind of thing—*outcomes*. However, as VET has become captive to market forces, curriculum seems to be regarded as an expendable luxury compared to the "real" business of competitive funding, fee levels, and "soft" qualifications. In such a climate, spending resources on planning a better learning program and deliberating on ways to deliver it effectively can easily seem like wasteful extravagance. With the current systemic imperative to minimize the costs of training, while at the same time requiring minimal qualifications for teachers and trainers, serious program planning is rather unlikely.

How does this current situation fare in relation to the perennial VET themes outlined in this chapter? On the one hand, CBT can be viewed as an extreme manifestation of VET moving away from genuine on-the-job learning toward more academic modes of learning. A simplistic and naïve view of academic learning is that it involves acquisition of many discrete items of knowledge together with a capacity to recall or transfer each item as needed. Training

understood as acquisition and transfer of each item on a competency checklist mimics this "commonsense," but erroneous, view of learning (Hager, 2005; Hager & Hodkinson, 2009). So, from the viewpoint of academic models of learning, recent VET developments reflect the thinnest, most threadbare understandings of what learning is. On the other hand, claiming the virtue of using workplace learning, some CBT is delivered by simply immersing students into workplaces. Often, however, this does not involve any comprehensive program of mentoring and guided practice, as occurs in a well-structured and well-delivered apprenticeship (Fuller & Unwin, 2003, 2004). Rather, it is about avoiding the expense of teaching or training students, and instead using them for the performance of menial tasks. As the "Workplace Learning Research" section will show, this approach makes a mockery of genuine workplace learning.

Nor do recent developments look good against the other perennial theme of VET shifting its main purpose between developing individual learners and meeting national economic and industrial priorities. Currently, the emphasis is certainly economic, but it is not focused on national benefit. Rather, increasingly the key driver is the economic benefit to VET providers. Students become a mere means to an end. So, probably for the first time in its history, VET is failing both individual learners and national economic and industrial priorities. What are the prospects for reinvigorating this uninspiring lexicon with some richer educational concepts?

Workplace Learning Research—A Late Twentieth-Century Development With Strong Significance for VET

The previous two sections, taken together, have suggested that the adoption of CBT and the increasing privatization of VET, both initiatives intended to streamline and improve VET, have in many instances actually worked in tandem to significantly weaken the overall quality of skills training. These initiatives between them broadcast the implicit message that skills development is a fairly mechanical process that virtually anyone can accomplish satisfactorily.

Are there any contemporary developments that suggest a way out of this downward spiral of VET? Over the last 25 years or so, there has been major research activity on the learning that occurs in workplaces, and on closely related topics such as professional practice ("professional" in its broadest sense) and the development of expertise. This substantial body of research (hereafter called *workplace learning research*) has direct consequences for the delivery of VET on a number of levels. First, some key findings of workplace learning research will be outlined and discussed, after which their implications for VET will be considered.

Major Findings From Workplace Learning Research
1) Workplace learning is an ongoing process, that is, it is always in the making.
2) Both workplace performance and the learning that arises from it draw upon and develop a type of seamless know-how. This know-how integrates a range of human attributes that is much wider than just rationality. This is one key aspect of the holism of both workplace performance and workplace learning.

3) Both workplace performance and the learning that arises from it are embodied phenomena (thus, dualisms such as mind–body, mental-manual, and theory–practice are rejected). This is a further aspect of the holism of both workplace performance and workplace learning.
4) Both workplace performance and the learning that arises from it are significantly shaped by social, organizational, cultural, and other contextual factors. This situatedness is yet a further aspect of the holism of both workplace performance and workplace learning.
5) Workplace learning is emergent from the context of performance in unanticipated and unpredictable ways (i.e., the nature and scope of the learning are not fully decidable in advance). Thus, changing contexts serve to transform workplace learning into an ongoing creative process. So, ever-changing contexts become the causal grounds of the ongoing processes of workplace learning.
6) Workplace learning encompasses both individual and social dimensions. That is, it is not exhausted by instances of individual learning, but also includes learning by groups or teams (Hager, 2016). This is yet a further aspect of the holism of both workplace performance and workplace learning.

There are some evident overlaps between several of these findings. This reflects the importance of the holistic dimensions of the phenomenon of workplace learning. Although there is some analytical value in identifying various components of the phenomenon, the set of components in itself does not constitute the original whole. This deficiency parallels the problems with CBT that were discussed earlier in this chapter. Thus, findings 2, 3, 4, and 6 highlight key dimensions of the holism of workplace performance and the learning that it engenders. Findings 1 and 5 point to the emergent processes associated with these kinds of holism.

It is perhaps worth noting here that although these workplace learning research findings serve to underline the deficiencies of CBT that have been identified in this chapter, they also suggest the outline of a more sophisticated approach to competence. Indeed, the holistic integrated approach to professional competence employed by various professions, as discussed here, accords closely with these workplace learning research findings (see Hager, 2017).

Perhaps the major general principle established by workplace learning research is that proficient performance in occupations that are even moderately complex involves seamless know-how, the development of which requires significant workplace experience. This means that highly skilled performance cannot be produced by formal education alone. There are two key aspects of this general principle that need further elaboration: the notion of seamless know-how itself, and the claim that significant workplace experience is a necessary condition for the development of this seamless know-how.

Seamless know-how denotes the capacity to enact a holistic performance that meets the contingencies of a particular, sometimes unique, situation. In some respects, such holistic performances will likely be novel as the earlier example of skillful driving demonstrated. It was suggested that skillful driving is characteristically founded upon the ongoing making of appropriate holistic judgments on

how to respond to changing circumstances. The holism of such judgments is evident in their seamless encompassing of diverse cognitive, bodily, affective, and other attributes. The nature of such judgments is a topic that will be pursued later in this section. A further important claim about seamless know-how is that significant workplace experience, of a kind that eludes formal education settings, is a necessary condition for its development. One reason why formal education activities alone cannot produce highly skilled performance of an occupation lies with the nature of practice-based know-how. This is often imprecise, implicit in character, and contextualized. It is therefore very difficult—in some cases, quite impossible—to explain it in abstract, theoretical terms. For many occupations in recent decades, changes in technology and advances in knowledge have out-stripped the capacity of formal courses to keep up-to-date. This has meant that ongoing learning, much of it from actual practice, is needed even by experienced practitioners simply to maintain their proficiency. The capacity to make sound occupational judgments, therefore, is always in the making. It is an ongoing process.

In this chapter's earlier discussion of HRD, a shift was noted toward immediate supervisors becoming responsible for the ongoing provision of training and mentoring of workers under their charge. This reflected a reaction against the practice of staff development happening away from the actual workplace. It also evidences a growing recognition of the importance of workplace learning. Of course, it requires as well that immediate supervisors have suitable mentoring skills, plus the designated time and resources to carry out effectively this important dimension of their work role.

The major theme of this section, that the evident holism of highly skilled work-place practice is founded on judgment, has been supported increasingly in the research literature. A notable forerunner of this idea is the Dreyfus model of skill development (Dreyfus, 2001; Dreyfus & Dreyfus, 1986). This aims to have broader applicability than just vocational skills development, because it models "the stages in which a student learns by means of instruction, practice, and, finally, apprenticeship, to become an expert in some particular domain and *in everyday life*" (Dreyfus, 2001, p. 32, emphasis added). As such, it anticipates later findings on workplace learning precisely because, across its stages of skill devel-opment, formal teaching or training is progressively displaced in favor of infor-mal experiential learning, which occurs over extended time periods of practice. Dreyfus (2001) views this essential process of experiential learning as resulting in the increasing capacity to make and act upon appropriate and sophisticated con-textual decisions. This decision-making capacity is equivalent to what later workplace learning theorists have termed *judgment*.

My own work, in conjunction with various colleagues, has long stressed the ongoing development of sound professional judgment as being the paradigm example of workplace learning (Beckett & Hager, 2000, 2002; Hager, 2013; Hager & Halliday, 2006; Lum, 2013). This work characterizes professional judgments as follows:

- Judgment making is an ongoing process—it is emergent from workplace practice.

- Professional judgments are essentially relational.
- Professional judgments are contextual—they include localized and particular as well as general aspects.
- Professional judgments are multidimensional—they include rational, affective, social, and tacit components.
- Professional judgments are purposive and hence normative (i.e., they are open to appraisal by experienced peers).
- Professional judgments are not restricted to individual workers. Sometimes, they are made by groups or teams.
- Professional judgments are characteristically holistic, as the third and fourth points in this list particularly suggest.

More recently, there has been an upsurge of research literature highlighting the key role of professional judgment in workplace learning and professional performance. Young and Muller (2014) accord professional judgment a central place in their proposed tripartite classification of professional knowledge. Their account sits well with the above outline of the implications of workplace learning research. The components of their classification of professional knowledge are singulars, regions, and fields of practice. Broadly, *singulars* comprise disciplinary knowledge, *regions* comprise applied interdisciplinary knowledge (i.e., selections from disciplines combined for particular purposes within a specific area of professional practice), while *fields of practice* are the specialized practical contexts within which professionals practice. An example of a region is the biomechanics component of a physiotherapy curriculum, which blends physiology and physics with stable, contextually derived knowledge. For Young and Muller (2014), the crucial feature of fields of practice is that they are the domain of knowledgeable and reasoned *professional judgment.* Such judgment draws upon, often tacitly, the professional's acquired stock of knowledge and know-how.

Winch (2010, 2014) provides a detailed analysis of various kinds of know-how and their relations to propositional knowledge ("knowing that"). To counter any suggestion that professional judgment is essentially technical, Winch's analysis stresses the holism of such judgments, including their ethical and political dimensions. He also emphasizes that an important, but often-overlooked, species of know-how is the making of appropriate conceptual inferences within the professional field (Winch, 2010). Derry (2014) likewise stresses the importance of this kind of conceptual know-how, tracing its growing theoretical significance to the work of Vygotsky and, particularly, to that of Brandom (1994, 2000).

Other concepts prominent in recent investigations of learning from workplace practice are *tacit knowledge* and *intentionality*, the latter encompassing other closely related concepts such as an occupation's purpose and its normative features. Tacit know-how encompasses both physical and intellectual dimensions as well as crucial affective dimensions that reflect a practitioner's character and dispositions. Winch (2014) provides some pertinent examples of significantly tacit affective know-how, such as persistence, diligence, and attention to detail. The intentionality of occupational practice highlights the goal-directedness or purpose of occupations. These features in turn entail a host of normative requirements for professional practice of the occupation.

These themes of conceptual inferences within an occupational field, as well as its intentionality, purpose, and normativity, converge in the recent work of Guile (2014a, 2014b). His focus is the relationship between knowing, learning, and acting in and between the contexts of education and work. His key concept for analyzing this relationship is *recontextualization*. This is expounded in terms of three underpinning principles:

1) The *purpose* of an activity determines how those involved in the activity deploy resources (conceptual, material, and social) to accomplish the activity, the purpose of which is to set up a mediating relationship between theoretical and practical knowledge.
2) All forms of human activity (theoretical and practical) occur in a *normative context* in which both conceptual and empirical claims are judged. Practitioners make conceptually structured professional (i.e., practical) *judgments* in context-specific circumstances.
3) Theoretical and practical (i.e., professional or occupational) reasoning presupposes *inferring* what follows from different types of concepts or actions and responding accordingly in specific situations. This stresses the relationality of thinking, acting, and planning, with suitable *judgment* underpinning it all.

The emerging recognition of the crucial relationship between workplace learning and the ongoing development of professional judgment is timely. However, more investigative work remains to be done. Many of the writers mentioned in this section focus firmly on the judgments made by *individual* practitioners. But it seems likely that a more nuanced account of these matters would consider the development of group or team professional judgments within occupations (Hager, 2016). Likewise, the affective aspects of group practice represent a promising, but thus far neglected, topic.

Implications of Workplace Learning Research Findings for Contemporary VET

In recent decades, VET has been increasingly positioned as a mere servant of industry and the national economy. Skills formation has been viewed as a mechanized process of delivering readily acquired discrete units of competence that supposedly represent all that employers and industry require of workers. Increasingly, these changes to VET are being driven by market forces. This chapter has provided multiple reasons for concluding that these developments are founded on a severely impoverished understanding of skills formation, one that will only ensure a decline in national skills capacity. What is needed for VET to once again become an educationally focused system, one that can truly deliver quality skills formation for the twenty-first century? What are the desirable foundations for a reimagined VET, one that will give VET a valued place in the education spectrum and that will better connect VET and workplaces?

First, what was lost in the developments discussed here was the imperative that VET should "meet the needs of students." VET should abandon its almost exclusive focus on industry needs by paying more attention to the needs of

students—something that it has done reasonably well for much of its history. A major purpose of VET should be to assist students to embark on a fruitful learning trajectory. Completion of a vocational preparation course should be presented as starting novices on an ongoing learning journey, *not* as achieving fully fledged competence, nor as the completion of learning. The importance of occupational know-how, or professional judgment, as an ongoing work-in-progress should be a standard focal point of VET curricula. Unfortunately, the rising costs of VET courses in countries such as Australia, together with the growing trend for students to be bound by repayable loans, only encourage providers to "sell" their products as gold-plated guarantees of competence and future job success.

As we saw, a major research finding is that workplace know-how (the capacity to make sound occupational judgments) is always in the making. It is an ongoing process. This finding applies not only to students, but also to their teachers. Because the seamless know-how that characterizes highly skilled expertise is the result of significant experience, it might be expected that normally VET teachers and mentors can be expected to perform at a level beyond that of their best students. The exception to this might be those physical skills for which performance declines with aging. The ongoing development of professional judgment is a matter of significant relevance to all students irrespective of how their career develops once they complete their VET course. For those who pursue an extended career practicing within their original chosen occupation, it will be a matter of continually refining and updating their professional judgment as both their practice and its contexts evolve. For those who progress through various higher levels of qualification, in either the original occupation or related fields of practice, it will be a matter of continually broadening and deepening their professional judgment as determined by the nature of their particular career path. For those who later choose to change to very different occupational fields, the concept of developing new, distinctively different kinds of professional judgment will be very significant.

Were VET to shift its focus more to student learning, it would require a different lexicon from the one that has prevailed recently. As was noted in this chapter, concepts such as skills development, learning, curriculum, and quality teaching have been displaced by educationally thinner fare such as skills checklists, outcomes, modules, assessment, customers, selling products, and so on. What are the prospects for reinvigorating this uninspiring lexicon with some richer educational concepts? A refocusing toward student learning would entail a somewhat different vocabulary, such as *ongoing learning, learning trajectory, learning from practice, developing judgment, occupational identity, contextual skills, traversal skills, degree of discretion*, and *autonomy*.

Second, although it is desirable that VET courses include learning experiences that approximate real workplace conditions, they cannot fully replicate the specifics of actual workplace situations. However, where possible, links between VET course experiences and workplace conditions should be fostered. This should include those situations where work is performed by teams or groups. Here, as against the traditional educational focus on individuals, students should be made aware of the learning possibilities in situations of collective agency.

But, in all cases, it should be made very clear to students that these VET course experiences are but a step along the way toward their professional judgment being honed and refined continuously by subsequent workplace experiences.

It is precisely because VET courses cannot fully replicate the specifics of actual workplace situations that college-based VET programs that aim to turn out graduates who are fully workplace competent inevitably fall short of their goal. At best, they can produce graduates who are "workplace ready." That is, only after a period of further learning from actual practice will these graduates be fully "workplace competent." This is the sense in which college-based vocational preparation programs are inevitably limited. The various professions have long known this. They typically follow up the front-loaded undergraduate program with a period of supervised or limited practice—internships, professional years, and probationary periods—during which the novice should become fully workplace competent. It is this learning from real practice that is seemingly necessary for, eventually, attaining expertise.

As has been stressed already, throughout much of its long history, learning from the experience of working has been a major component of VET. It is an integral part of VET's long-term specialty—the apprenticeship model. However, as a plethora of new kinds of VET offerings, some shorter than apprenticeships and others longer, have made VET more heterogeneous, the vital role of learning at work has been increasingly overlooked. Even where workplace practice occurs parallel with such programs (e.g., part-time diploma students concurrently in employment), it is typically not structured to integrate with the VET learning, as happens in any well-organized apprenticeship.

Workplace learning research implies, therefore, that VET courses should be modeled on the ways that well-structured and well-delivered apprenticeships have traditionally operated. That is, VET should favor a vocational learning paradigm over more academic course patterns that have emerged over the last century of VET. Such a vocational learning paradigm is founded on the key principle that workplace learning is a vital component, both for becoming a skilled practitioner of an occupation and for maintaining one's currency as a skilled practitioner. A vocational learning paradigm, both by recognizing the key role of workplace learning and by focusing on student learning needs, would be aligned with the perennial themes that represent the strengths of VET.

The history of VET also suggests that its major focus should be the development of highly skilled practitioners. Whenever this prime focus is neglected, the quality of training declines. The increasing emphasis on VET as a profit-making enterprise at the expense of the provision of high-quality training is but the latest example of such a loss of focus. We ignore the lessons of VET's history at our own peril.

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5

Does Vocational Education Still Need the Concept of Occupation?

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Introduction

Making the transition from education to work and finding sustainable paid work, under contemporary labor market conditions, present a considerable challenge. There are high levels of persistent youth unemployment and underemployment in many countries, including member states of the European Union (Eurostat, 2018). This raises questions about the nature and currency of education and training pathways and qualifications, the availability and nature of employment, and the linkages between them. Many young people (as well as older adults) are unemployed, self-employed, freelance, on "zero hours" contracts (where the hours of work are not stipulated, with no minimum hours guaranteed), or moving in and out of temporary employment contracts. In this environment, the concept of training for and in an occupation is likely to have changing resonance and meaning. If you are a young person leaving school or college, what does the concept mean to you? Would you want one; and, if so, how would you achieve it? Would the answers to such questions differ from how an occupation was understood and pursued by previous generations?

Concerns about the growing "precarity" (Standing, 2011) of youth prospects feed into changing patterns of educational participation, including extended education-to-work transitions (du Bois Reymond, 2004; Brooks, 2010; Helve & Evans, 2013) and the expansion of higher education (HE). Rising enrollments in HE are an international phenomenon (Marginson, 2016), reflecting a situation where more and more individuals (and countries) are using higher level educational attainment as a strategy for seeking "positional capital" in the global labor market competition for good jobs (Brown, 2000). This growth has had a knock-on effect on vocational routes, with reduced demand from school leavers for intermediate-level vocational education and training (VET) and

apprenticeship routes being experienced in some European countries (Deissinger, Aff, Fuller, & Jorgensen, 2013).

From the perspective of individuals (and in line with human capital theory), the assumption is that investing time and effort in the attainment of further and higher education, skills, and qualifications will generate positive returns in terms of access to well-paid employment and labor market status. For many, pursuing a strategy of achieving a strong level and breadth of general education that keeps doors open for later decisions about occupational or professional specialization appears to make sense (Deissinger et al., 2013; Wolf, 1997). Many occupations that previously did not require higher level educational attainment have raised their educational entry requirements, further fostering the growth in importance of qualifications and particularly bachelor degrees (Fuller, Felstead, Jewson, Kakavelakis, & Unwin, 2007). The expansion of HE has also led to its diversification, particularly in terms of an increase in more vocational provision, including in areas such as business administration, marketing, music production, accountancy, and nursing. In the past, experience, proven ability, and work-based forms of initial and continuing training would have predominated as the pathway to skilled higher level roles. However, contemporary changes in recruitment practices and the rise in the number of students in universities mean that HE has appropriated responsibility for the supply of labor into a wider range of sectors and associated labor markets.

The expansion of HE to include provision for and pathways to occupations previously accessed through work-based forms of initial education has diversified the scope and character of what the sector offers. A growing challenge for higher education institutions (HEIs) internationally is developing provision that is recognized as relevant and useful by employers, and that facilitates students' progression into cognate, graduate-level jobs (and where the supply of such jobs is constrained). The growing international supply of well-qualified young people, and concerns about the capacity of the graduate labor market to absorb them, led Brown, Lauder, and Ashton (2011) to argue that the "promise" of a quality graduate job for those investing in HE has been broken (see also Marginson, 2016).

The rapid global growth in graduates means that obtaining a degree is often no longer sufficient to generate the rewards and security available to previous generations, when a far smaller percentage of the cohort reached this level. These factors are generating renewed policy interest in reforming vocational education and apprenticeship as a way of reinvigorating their appeal to both individuals and employers, and constructing an alternative route to good-quality employment and social mobility (Fuller & Unwin, 2012). One key policy challenge is finding ways of creating provision that can offer access both to recognized, skilled occupations and to HE (Deissinger et al., 2013). Another is the challenge of creating programs that are accessible to those with lower levels of educational attainment at the same time as ensuring they appeal to those with "good" academic qualifications and are valued by employers.

In light of this background, it is important to consider both what an occupation means under contemporary social, economic, and policy conditions, and the strength and nature of the relationship between education, training, and occupation. This chapter is organized in three sections. First, I sketch out some

of the key historical aspects of socioeconomic and institutional change that underpin the contemporary context and debates about the concept of occupation. Second, I discuss the changing relationship between apprenticeship and occupation. This discussion will draw on two contrasting examples illustrating the differences between apprenticeship designed around a narrow job role rather than a holistic occupation. The third section presents my conclusions.

Socioeconomic Change and Implications for the Relevance of Occupation

There is a burgeoning literature exploring the changing nature of work and employment. However, in this section, I draw on older literature to indicate that the contemporary picture has its roots in longer standing debates about the nature and direction of economic and industrial change in advanced industrialized countries for the division of labor, with implications for skills and for the continuing relevance and changing nature of occupations.

Historically, discussion about economic change revolved around two major issues: first, the periodization of economic change and, in particular, whether the late twentieth century could be characterized as a radical break with Fordism; and, second, the implications of trends in production and work organization for skills (Fuller, 2001). The former topic focused on the factors that combined to produce (relatively stable) economic periods despite the inherently unstable nature of capitalism. It also addressed the reasons for the breakdown of such phases and whether emerging forms of production and work organization constituted a new "stable" period. These matters were subject to intense debate around the question of whether a period characterized as Fordism or industrial society gave way to a new era of post-Fordism/industrialism or flexible specialization (Amin, 1994; Wood, 1989). Some argued that there was a definable new period dating back approximately to the early 1970s, when the factors seen to support the Fordist system became terminally undermined (Freeman, Clarke, & Soete, 1982; Freeman & Perez, 1988; Piore & Sabel, 1984). In contrast, a more tentative stance was outlined by French economists in the 1970s, known as the "regulation school" (Amin, 1994).

The second area for debate concerned the implications of changing forms of organization and styles of production, often associated with the breakdown of Fordist "stability" for skills (Brown & Lauder, 1992; Wood, 1989), and more recently included discussions about learning in the "knowledge economy" (Guile, 2010; Livingstone & Guile, 2013). One strand of the debate revolved around the extent to which technology, including "advanced automation technologies" and "advanced electronic communication and information technologies" (Casey, 1995, p. 29), could be seen as the main determinant of change. Some, including "post-modernists" such as Aronowitz (1981) and Touraine (1981), read off implications for skills directly from technological capability, arguing that automation led to unemployment and declining skills (see also Braverman, 1974). In contrast, some researchers including Gallie (1978) and Zuboff (1988) suggested that the introduction of new technology could lead to increases in skill levels.

It should be noted, however, that Zuboff was also pessimistic about management's willingness to encourage and reward employee development (see also Fuller et al., 2007; Fuller & Unwin, 2010). Ashton and Green (1996) drew on the literature of international comparisons to propose that it was the way technology was used, not technology itself, that influenced patterns of production and organization and therefore the demand for skills. Others, from the perspectives of political economy, industrial relations, and economics (Keep & Mayhew, 1988), argued that demand for skills should be seen within the overall economic competitiveness strategy being pursued at the national or company level.

An important insight deriving from Ashton and Green's (1996) analysis was that at the company and national level, low as well as high added-value skill routes could produce growth. Economic success depended on the coherence of business strategy with a range of economic, product, and institutional factors, and crucially on the type and level of market demand. Streek (1989) argued that the "democratic corporatism," which he associated with Germanic capitalism, was more likely to produce economic success in post-Fordist circumstances than the "neoliberal" deregulatory approach associated with Anglo-American capitalism. This was because the "free-rider" issue in a less regulated system inhibited company-funded training because employers were concerned that competitors would poach their (trained) employees rather than train their own. In contrast, the democratic corporatism model entailed a social partnership between the state, employers, and unions that enabled not only the costs of training to be more widely shared but also the range and parameters of occupations to be collectively defined and regulated (for a more recent and expanded discussion, see Busemeyer & Tramputsch, 2012).

The breakdown in countries such as the UK and the USA of the highly stratified occupational classifications and segmented forms of work and production that developed during the late nineteenth and first three-quarters of the twentieth centuries was the context for Robert Reich's (1991) argument that, by the 1990s, occupations had become much less relevant in the context of late twentieth-century economic and technological change. Increasing labor market flexibility and weak regulation associated with the UK and US economies added to the challenge. Reich's US-based analysis led him to propose a radical recategorization of work in terms of three overarching work roles, which were not based on discrete occupations or occupational skills. These were "routine production services," "in-person services," and "symbolic-analytic services." *Routine production services* referred to traditional blue-collar jobs in mass production enterprises as well as "routine supervisory jobs performed by low and mid-level managers … involving repetitive checks on subordinates' work and the enforcement of standard operating procedures" (Reich, p. 174). *In-person services* were similar in character to the first category in that they entailed routine and relatively simple tasks. The main difference between the two was that in the latter case, "services are provided person-to-person" (e.g., beauticians, retail assistants, cleaners, and security guards); and the number of such jobs was growing (Reich, pp. 176–177). Finally, Reich defined *symbolic-analytic services* as "problem-solving, problem identifying, and strategic brokering activities" and as including all those who "solve, identify and broker problems by manipulating symbols." Of these roles, it

was only the last, the symbolic analysts, comprising about 20% of the American workforce in 1990, which Reich saw as having an increasingly strong position in contemporary international labor markets on the grounds that they had the ability to add value to an enterprise through the creative use of high-level knowledge and skills.

A key point made by Reich (1991) was that traditional job titles and types such as secretary, sales assistant, and lawyer did not map neatly onto the three "functional categories" just outlined. In particular, it could not be assumed that professionals were necessarily engaged (mostly) in symbolic-analytic work. Reich gave the example of the accountant, whose time was filled by conducting "routine audits" and who would not be defined as a symbolic analyst (p. 181). Reich argued that it was no longer sufficient for someone to master a codified body of knowledge. The test of symbolic analysts was their ability to create new knowledge as part of their daily work. His analysis undermined traditional conceptions of occupational identity and solidarity, which were associated with apprenticeships, credentialed entry, shared mastery of knowledge, occupational skills and conventions, and strict boundaries between occupations. In contrast, Reich emphasized the relevance of generic personal and cognitive skills for the provision of symbolic-analytic services. He perceived that these were best fostered through good-quality general and higher education and the opportunity to learn from other symbolic-analysts.

With the benefit of hindsight, we can see that aspects of the trends identified by Reich and others have continued and accelerated into the twenty-first century with a shift in many countries toward service sector employment. The development of new information and communication technologies, robotics, and the digital economy has enabled traditional services, processes, and products to be produced, distributed, and sold in new ways. Perhaps this is most clearly illustrated and experienced through the dramatic rise in global e-commerce and online services with associated consequences for employment, education, training, and the concept of occupation. The implications of globalization include the facility available for multinational corporations to (re)locate their production and other aspects of their business, such as research and development, and so routinely creating, losing, and displacing jobs across countries and continents, as well as allowing small businesses and microbusinesses to compete and sell their services within a global marketplace.

The traditional division of labor was based on demarcated skills, and occupational and trade boundaries designed to meet the needs of a differentiated labor process and hierarchical forms of organization. The relative economic stability associated in the past with Fordism together with individual expectations founded on tradition meant that "in-career" shifts between types of work, employment and self-employment, and trades and occupations were less common. In this context, front-loaded postschool education and training (for reserved occupations) made sense and was linked to the development of a secure platform for progression and good wage returns, but it is a more contested model under much more dynamic contemporary socioeconomic and labor market conditions.

Building on Reich's pioneering "post-occupational" analysis, it could be argued that the significance of the symbolic analysts is growing. The point at issue is that

the pace and scope of employment-related, occupational, and industrial change have helped to create a context in which many people's contemporary experiences and perceptions about occupations and careers are characterized by uncertainty, risks, and uneven opportunities. Global forces and trends have undermined the concept and availability of stable occupations. It follows that expectations for many individuals, particularly in countries with a flexible, dynamic, and relatively unregulated labor market, include a recognition that it will be necessary for them either to move between jobs as occupational skills become obsolete, or to reskill as the range of activities and capabilities required within roles alters in line with changing and emerging specialisms.

Those currently in the latter part of their working lives are in a particularly apt position to reflect on the work histories typical for their parents and grandparents, in contrast with the trajectories likely to be available for their children and grandchildren. Taken together, dramatic changes in the availability and nature of work and occupations combined with significant changes in the composition, education levels, and skill levels of the workforce present a real challenge for young people and their families to plot a course leading to economic independence, social status and autonomy, and satisfying, fulfilling paid work.

Debates about contemporary youth transitions draw attention to the uneven resources, capacity, and agency of individuals to navigate socioeconomic structures and take responsibility for their destinies, navigating the risks and threats while taking opportunities to achieve their desired outcomes (Bathmaker et al., 2016; Helve & Evans, 2013). From this perspective, young people and adults are confronted not only with an observably uncertain labor market but also with the notion that their own position within it relates directly to their (lack of) attributes. Hence, we are seeing the emergence of innovative and hybrid strategies designed to achieve positional advantage in a context where well-defined routes to secure and progressive occupations are in short supply. For example, there may be an increase in what Wilson (2009) has termed "reverse transfer" (see also Moodie, 2009), where young people move on from a higher level, more academically oriented course to a lower level, more vocationally oriented program. In Germany, there has been a rise in the number of *Doppel-Qualifikation,* young people who leave school with the required Abitur qualification to enter HE, but decide to complete an apprenticeship first (Pilz, 2009).

In several European countries, there has been a growth in the development of "hybrid qualifications," which aim to overcome the theory–practice boundary (Deissinger et al., 2013; Graf, 2016), and in the UK, Higher and Degree Apprenticeships were recently introduced. For example, Graf's (2016) analysis and comparison of trends in Germany, Austria, and Switzerland have shown that they have all been developing hybrid provision that offers a combination of work-based training, vocational education, and HE. However, these trends raise concerns about (and possibly risk) devaluing the status of apprenticeships aimed at the traditional intermediate or skilled segment of the labor market (Fuller & Unwin, 2017).

To summarize, I have identified two major trends or themes. First, the nature of socioeconomic, technological, and industrial change has undermined the

concept and the availability of clearly defined and stable intermediate-level occupations that provide a structure, framework, purpose, identity, and returns to those who undertake VET, or apprenticeship pathways. Second, I have identified the growing importance and expansion of HE for an increasing proportion of the population as a strategy that individuals think (as do governments) will help them gain position in an uncertain, flexible, fluid, and dynamic labor and occupational market context. It is with this background in mind that I turn to exploring how traditional forms of skills formation and the notion of occupation are changing in response to contemporary economic and employment challenges.

Changing Relationship Between Occupation and Forms of Skill Formation

The dynamic and contested nature of contemporary labor markets and employment contexts is reflected in the changing concept of occupation (Fuller & Unwin, 2013; see also Chapter 2, this volume). A useful way to approach the meaning of occupation is to consider the term *job*, which Clarke (2011) has argued has a much more limited meaning than *occupation* because it is connected to an employment contract in a workplace. Hence, a job description lists the tasks that an individual is required to perform. In contrast, an occupation is a much more general and all-encompassing term for employment in which individuals are engaged, and it is *not* restricted to a particular employer or workplace. From Clarke's perspective, *occupation* is aligned with the German concept of *Beruf*, which aligns with the idea of vocation and is applicable across the socially constructed hierarchies of occupations or professions.

Braverman (1974) argued that up until Frederick Winslow Taylor developed his scientific management techniques in the late nineteenth century, "the craft or skilled trade was the basic unit, the elementary cell of the labor process" (p. 109). For Braverman, occupations became deskilled or, in the case of crafts, wiped out as a result of Taylor's efficiency revolution and the removal of the opportunity for workers to conceptualize and have discretion over their own work tasks. Like Braverman, Sennett (2008) has argued that Tayloristic or Fordist forms of labor processes severely restrict opportunities for people to develop and deploy their occupational expertise. The concept of occupation is central, then, to understandings of how labor markets are organized as well as to the interlinked development of identity and expertise. Occupational identity should not be seen as a static concept, but one that is dynamic and multifaceted. Individuals construct and have their occupational identities shaped within (a) changing institutional and cultural contexts, (b) the social relations of particular workplace learning environments, and (c) changing labor market conditions and hierarchies.

The development of an occupational identity (the process of "becoming") takes time and commitment, and, hence, the process of maturation has always been seen as central to apprenticeship. In his discussion of the development of occupational self-concept and commitment to an occupation by apprentices in

printing, Flude (1977) talked about the concept of "anticipatory socialisation"—the notion that as individuals progress through their training, they become more likely to identify themselves as a full member of their occupational group. Flude was arguing that apprentices were training not just for a job role but also to have the status of full members of a stable and well-defined occupational community. However, as Braverman's and subsequent analyses including by Reich (1991) and Casey (1995) have highlighted, industrial and technological innovation in the late twentieth century undermined the demand for and availability of traditional occupations and skilled trades and associated intermediate-level education and training.

It is important, then, to recognize that the relationship between industrial, technological, institutional, and social change; the nature of occupational expertise; and the structure and character of labor markets are not unidirectional or fixed but are dynamic and varied across countries with different institutional and cultural VET histories. In the German context, the development of occupational identity and expertise continues to be reinforced through standardized apprenticeship training ordinances, as well as by the legal definition and protections of skilled occupations. This regulated and standardized institutional model of apprenticeship also plays an important role in developing citizenship (Cohen, 2007). Despite the ongoing strengths of this approach, however, questions are asked about the ability of the model to adapt in response to changing patterns of educational participation, and in the face of industrial, technological, and labor market change (see Deissinger, Chapter 15).

Historically, in England, apprenticeship was strongly aligned with the concept of skilled occupations. Apprenticeships were expected to provide a solid platform for enabling the individual to be recognized as a skilled worker, able to earn a living (benefitting from the associated skilled-work wage premium) as an autonomous practitioner in their occupational field. However, over the past 30 or so years, two interrelated developments have disrupted the occupational apprenticeship model. First, the funding and structure of VET programs from the late 1980s became based on the acquisition of competence-based qualifications, which measured performance in a set of specific job tasks (Raggatt & Williams, 1999; Unwin, 2004). This outcome-based approach meant that the acquisition of qualifications could be separated from the process of learning for occupational mastery, as well as being divorced from the notion of occupational identity formation. Second, and relatedly, the concept of *sector* came to be used as a supply-side mechanism for the organization of government-funded VET. In keeping with this shift, the introduction of government-supported apprenticeships in the early to mid-1990s was based on a sectoral competence-based, rather than an occupational, model. This was expressed through the creation of apprenticeship as a "wrapper" for a set of task-related competences located and assessed within sector frameworks, rather than being seen as a program of learning leading to recognizable occupational identity and expertise with clear labor market currency (Fuller & Unwin, 2003a). Some occupational areas managed to retain a strong relationship between the concepts of occupation and apprenticeship, but many did not, resulting in what Fuller and Unwin (2003b) have termed a "restrictive" approach to apprenticeship.

In some apprenticeships (e.g., in engineering and construction, hairdressing, and parts of hospitality), the relationship of apprenticeship to occupation still has meaning due to the maintenance of a strong and longstanding apprenticeship culture and the continuing availability of distinctive skilled employment, but in others (e.g., in customer service, parts of retail, business administration, and health and social care) the connection is underdeveloped or even nonexistent. In countries with labor markets that are more flexible, the institutional supports and arrangements for the development of occupational expertise, identity, and commitment are quite weak. Importantly, there is limited occupational regulation or use of license-to-practice provisions that are associated with occupational labor markets, and this restricts the benefits (e.g., wage premia) that can accrue to the completion of an apprenticeship that provides a portable qualification (Turbin, Fuller, & Wintrup, 2014). Individuals are increasingly expected to change jobs throughout their working lives, with career progression tending to be linked to internal, rather than external, occupational labor markets. This produces a model of commitment that privileges the relationship between individual and employer rather than between individual and the occupation, and militates against collective institutional approaches to skill formation (Cohen, 2007).

If apprenticeship is first and foremost a model of learning for occupational expertise that supports the apprentices to become full members of an occupational community, this assumes, first, that there is a defined occupational community to join; and, second, that apprenticeship is a recognized and formalized route to achieving the relevant occupational expertise required to join the community. What follows from this is that each occupation has a defined knowledge base and an associated curriculum that has to be completed and examined in order for the apprentice to show that they meet the requirements to practice as a recognized member of the community. As a result, the apprentice has, at the outset, a clear sense of the occupation they are aiming for. They know that if they meet the requirements, they will gain the necessary certification for employment in that occupation.

However, it is difficult in some vocational areas to understand what it means to have occupational expertise in the context of flexible and dynamic labor market, employment, organizational, and occupational conditions and, relatedly, what vocational education, training, and apprenticeship routes might be designed with this in mind (see Lahiff & Guile, 2016). The challenge is to develop intermediate vocational routes, including apprenticeship, that appeal to workers by (a) enabling apprentices to gain the knowledge, skills, and capabilities that will facilitate their access to "good jobs"; (b) leading to higher level vocational qualifications (at the sub-bachelor level) or generating the currency for accessing bachelor degree provision; and (c) contributing to the development of the relational and organizational capabilities and networks that will facilitate individuals' ability to survive (and potentially thrive) under contemporary labor market and employment conditions.

Two examples from the UK can be drawn on to illustrate the continuing significance of the concept of occupation to skill formation. In the first case (Golf Greenkeeper), an apprenticeship is linked to a narrow, relatively low-level

job role, and in the second (Dental Technician) to a holistic, highly skilled occupation. The role of Golf Greenkeeper involves the maintenance, care, and overall appearance of a golf course. The apprenticeship standard positions this job at a semiskilled level (Level 2 in UK terms). Apprentices are required to achieve low-level certificates (associated with expectations for 14-year-olds) in English and Mathematics, with this being the only general education component included in the standard. The narrowness of the role indicates that this apprenticeship is not underpinned by a strong concept of occupation. A more holistic conception would have included the development of knowledge and skills associated with becoming a broader based expert, qualified to maintain grounds and landscapes across a range of sports and leisure activities as well as golf. Limiting the role to golf green maintenance signals a level of specificity that ties it to a particular job role, rather than opening up the apprentice's access to vocational and scientific knowledge, concepts, and principles that are relevant to understanding the properties of diverse natural and artificial playing surfaces and types of ground and that would have provided a stronger platform for career mobility, development, and progression. Moreover, the scope and level of general education included in the apprenticeship fail to generate sufficient currency for accessing more advanced educational opportunities.

The Golf Greenkeeper apprenticeship does not facilitate a significant and substantial journey of skill formation leading to recognition as a skilled practitioner in a broad occupational field. Rather than having one standard with the capacity to cover the whole trajectory from novice to expert, the path for apprentices wishing to progress is obscure. The completion of the Golf Greenkeeper apprenticeship takes participants only partway on a journey to occupational expertise, and, although a cognate more advanced apprenticeship exists, this still does not offer credentials that would facilitate the individual's progression to HE.

The second example, of a Dental Technician apprenticeship, provides a very different case. The apprenticeship standard covers the design, manufacture, modification, and repair of custom-made dental appliances. In contrast to the Golf Greenkeeper, the Dental Technician is not positioned relative to other roles in an occupational or organizational hierarchy. Rather, it is a well-defined, discrete, and highly skilled occupation in which qualified practitioners have discretion over the execution and evaluation of the devices they are manufacturing and crafting. Dental Technicians have the autonomy necessary to sign off their own work (within the scope of the original specification) as well as that of their semiskilled assistants. The Dental Technician is located within a family of dental occupations regulated by the General Dental Council (GDC), all of which have protected titles. This means that the only people permitted to refer to themselves as "Dental Technicians" and to register as such with the GDC are those who have been through a prescribed and approved education and training route or apprenticeship, and have achieved an acceptable qualification accredited by the GDC. The occupational standard stipulates that a Foundation Degree in Science in Dental Technology is a mandatory qualification. The requirement for this level of knowledge and understanding in related science and technology, combined with the development of advanced craft skills as well as the artistic dimension,

signals that this apprenticeship is based on a holistic and strong concept of occupation. Becoming a Dental Technician requires substantial training and workplace practice, and it enables significant progress up the educational ladder (including at the HE level). The Dental Technician example is illustrative of a pathway to expertise, based on a well-defined and broad concept of occupation. It contrasts starkly with the Golf Greenkeeper, based on a narrowly defined job role and a weak, low-level specification of occupational expertise.

Conclusion

Although written over 25 years ago, Robert Reich's post-occupational analysis raises pertinent questions about the continuing relevance, role, and nature of occupationally based apprenticeships under contemporary socioeconomic and labor market conditions. The challenge can be viewed as particularly acute in liberal market economies, characterized by flexible labor markets, nonstandard employment relationships, and limited occupational regulation and license-to-practice arrangements. Against this backdrop, the issue of what an occupation means under contemporary conditions raises important questions for education and training.

From the perspective of policy and practice, there are some questions that may be helpful in thinking about the relationship between apprenticeship and the concept of occupation and its potential to provide an expansive platform for progression. First, how is the occupation defined; and does it provide a launch pad for educational progression and mobility within an occupational field, or is it closely tied to the job role prescribed by particular employers and a low academic level? Second, what is the relationship between the occupation, the model of education and training, and its associated pathway? To what extent can the individual rely on successful completion of the pathway and their achievement of expertise being collectively understood by employers within an occupational community? In what type of labor market is the occupation located? Third, how strong is the currency (qualification) for access to further and higher education?

Definitions of occupation can be viewed on a spectrum, with specific, narrowly defined jobs at one end and, at the other, an umbrella concept characterized in terms of a broad occupational field such as business administration, health and social care, and construction and the built environment. Designing apprenticeships or VET around specific job roles may suit the short-term needs and workforce model of particular employers, but the disadvantage is the lack of capacity and currency it affords the individual as a platform for progression. Alternatively, designing provision around broad-based sectors may allow for vocational and general education that facilitates access to HE, and it potentially keeps the individual's options open. However, this latter approach is unlikely to offer a clear articulation or transparent pathway to positions in skilled occupations.

Wheelahan, Buchanan, and Yu (2015) have drawn on Nussbaum and Sen's capabilities approach to develop the concept of "vocational stream" as a way of

capturing the need for and benefits of broad-based vocational preparation in some occupational areas. They argue,

> The development of such streams would provide graduates, especially VET graduates, with more transferable skills, giving them the capacity to better adapt to changing labour market circumstances. This in turn would ease the difficulty faced by organisations when sourcing the labour they need as business circumstances change. (Wheelahan et al., 2015, p. 8)

Such provision would be designed to give individuals a general orientation, knowledge, and skills linked to sectors characterized by a range of occupational roles sharing similar characteristics and belonging to a "vocational labour market … defined as the demand for and supply of related occupations, those that share common underpinning knowledge, skills, and practices" (Wheelahan et al., 2015, p. 8). With their focus on the linkages between "vocations" and employment, the researchers recognized that the concept of vocational stream worked best in sectors such as business administration, which in countries such as Australia and the UK do not have a tradition of qualifications with strong occupational or labor market recognition.

Lahiff and Guile's (2016) study of participants in a media production apprenticeship showed there is scope for innovation. Work in this sector is increasingly undertaken by freelance workers, coming together in teams to undertake specified projects. Drawing on the accounts of apprentices, Lahiff and Guile illustrate the "experience of learning in distributed and decentered working conditions" (p. 304) and how some individuals were able to draw on this as a resource to develop social capital as well as occupational knowledge and skills. The opportunity to accrue and mobilize their social capital was seen as crucial to establishing a "career" in an occupational field and labor market without the hallmarks of strongly occupationally based apprenticeships and conventional employment options. It is increasingly important that provision is designed in light of the dynamic trends in the nature and availability of occupations and how they are accessed, which were highlighted earlier in the chapter.

Addressing the problem of progression requires programs of publicly funded vocational learning (including apprenticeships) and the qualifications associated with them to be conceptualized as the means toward achieving occupational expertise and a platform for progression, rather than solely the attainment of narrowly defined jobs competences. If a broad and dynamic concept of occupation underpinned VET at all levels through to and including HE, the content of programs, including those classified at the sub–bachelor degree level, could be substantially enhanced. Rather than the atomized concept of job tasks that underpins the competence-based approach, an expansive approach requires attention to the curricula, pedagogy, and qualifications that can ensure much stronger benefits accruing to a hybrid approach.

At one end of the range of options, this would mean ensuring that apprenticeships underpinned by a strong concept of occupation and occupational labor market recognition also have clear currency for progression to higher level education. At the other end, it would mean ensuring that apprenticeships or

full-time vocational education in a broad area, with weaker labor market linkages, generates educational currency for higher level progression. There are implications here for HE, too. First, the articulation between intermediate and higher provision and the associated progression pathway should be elaborated and be transparent to individuals, providers, and employers. Second, serious consideration needs to be given to the structure and character of higher vocational education, particularly in fields with weak occupational linkages and definition. Students should have the opportunity to undertake planned work-placements that enable the development of significant workplace learning and skills, facilitate the development of relationships with employers and the labor market, and provide experience in contemporary work and employment practices in the relevant sector.

Although gaining a vocationally oriented degree is no guarantee of gaining graduate-level employment in a cognate area, it can be argued that where provision combines academic development with good-quality work-placements, individuals can gain the capabilities and social networks to help them navigate increasingly complex labor market landscapes. Given that vocational HE is the option that increasing numbers of young people in many countries have been pursuing in recent years, it is becoming more important that providers, employers, and professional bodies work together to build educational and work-based ladders of progression and to create additionality and enrichment within higher level provision.

It would be an overclaim to suggest that rethinking the concepts of occupation, VET, and apprenticeship can resolve all the tensions and challenges created by contemporary work, the labor market, and HE trends. Nonetheless, providing young people with opportunities to engage in diverse and rich forms of participation in networked education-to-work communities can help them develop hybrid resources, including social, educational, and occupational capital, that could help them weather and potentially even thrive in the global economy.

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6

Knowledge, Competence, and Vocational Education

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Introduction

There is growing support for competency-based education (CBE) in North America. Supporters of CBE in the USA call on no less than President Barack Obama in support of their cause, following his speech in 2013 announcing reforms to make postsecondary education more affordable: "If you can show competency, if you know your subject matter, it shouldn't matter how many hours in a classroom you work" (Tamburri, 2014, n.p.). CBE was introduced in the UK and Australia in the 1980s, but now there is waning enthusiasm and support for it in the UK, while the 20-year-old debate about its value continues unabated in Australia. There is much that participants in the CBE "movement" in North America could learn from exploring experiences and debates in countries where CBE has been established.

   The rationale for the introduction of CBE in the countries where it has been introduced is to improve links between education and the labor market and to support social inclusion and social justice by supporting disadvantaged students to gain valued qualifications. However, this chapter argues that instead of achieving these goals, CBE acts to reproduce social inequality by denying disadvantaged students access to the theoretical knowledge they need to participate in debates and controversies in society and in their occupational field of practice. In developing this argument, the chapter draws on the sociology of Basil Bernstein (2000) to demonstrate the way in which the structures of CBE systematically deny students access to the underpinning theoretical knowledge that they need to be agential participants in debates in society and in their occupations. Bernstein's theoretical frameworks have been fundamental for the "social realist" perspective within the sociology of education that argues that the *raison d'être* of education, including vocational education, should be to provide

students with access to theoretical knowledge (Young, 2008). This chapter is situated within that perspective.

The first section of the chapter outlines Bernstein's theory of knowledge. The second section of the chapter explores the way in which CBE and competency-based training (CBT) exclude students from access to theoretical knowledge. The final section returns to an exploration of the reasons why CBE is enjoying such a resurgence in the USA, and discusses why its proponents should look to debates in other Anglophone countries to learn from their experiences.

Bernstein's Theory of Knowledge

Bernstein (2000) argues that students need access to theoretical knowledge as a condition of democracy because it enables students to participate in conversations in society and in their occupational fields of practice about what they have done in the past, what they should do differently in the future, and why. Fair access to theoretical knowledge is important because it is the means society uses to conduct its conversation about itself and about what it should be like. Societies use theoretical knowledge to understand the social and natural worlds, to go beyond appearances and beyond that which is accessible to individual experience. Theoretical knowledge allows us to think about the future, and to imagine alternative futures and what it would take to achieve these. We use science, social science, the humanities, and the arts to imagine alternative, sustainable, equitable, and socially just forms of production, living, and being. Education really matters for society because access to and attainment of postsecondary qualifications are associated with opposition to populism (Sayer, 2017).

Theoretical knowledge also supports democratic participation in society, social inclusion, and social mobility because it is the basis for occupational and educational progression. Young (2006) argues that while all jobs require context-specific knowledge, "many jobs also require knowledge involving *theoretical* ideas shared by a community of specialists" (p. 115) located within the disciplines. Workers need to be able to use theoretical knowledge in different ways and in different contexts as their work grows in complexity and difficulty. This takes on added importance because the increasing complexity of technology, work, and society means that the knowledge demands of most occupations have increased. Occupational progression is strongly related to educational progression because education is the main way in which most people are provided with access to theoretical, disciplinary knowledge. It also means that all qualifications should provide students with the disciplinary knowledge they need to study at a higher level within their field as well as for immediate occupational outcomes.

Students need access to the theoretical basis of practice in their occupation if they are to be fully participating and agential workers. Without access to the theoretical knowledge that underpins their practice, workers have limited autonomy because they generally only have access to procedural knowledge that they can apply in specific circumstances, and they must rely on others for instruction

in what they should do if different circumstances arise. For example, childcare workers need access to theories of child development and the child in society if they are to support the children they work with and their families. Electricians need access to mathematics and not just formulas if they are to select appropriate, contextually specific applications of mathematics in their practice.

Each occupation has its own challenges about the nature of practice, ethical issues and dilemmas, and different perspectives about how practice and their field should be developed in future. If students are to participate in these debates, they need to have access to, and be able to use, the specialized knowledge that underpins practice in their occupational field. Consequently, theoretical knowledge is "powerful knowledge" because it provides us with access to the knowledge we need to understand the natural and social worlds, and it provides the tools we use to debate how we should understand the past and what it means for us now, how the present should change, and what the future should be like (Wheelahan, 2007; Young, 2008).

However, this doesn't mean that theoretical knowledge is "true"; rather, it means that it is our best approximation to the truth so far. If knowledge in the academic disciplines were "true," then it would not change. Positing that academic knowledge is true treats knowledge and the boundaries between different kinds of knowledge as fixed and given because they are the authoritative voice of knowledge. Young and Muller (2010) explain, "These traditions are overwhelmingly static because their boundaries are fixed by social imperatives that override the conditions for knowledge and its innate dynamism, fecundity and openness to change" (p. 17). This reflects conservative approaches to curriculum that insist on transmitting the "canon" as the voice of authority, rather than as the means we use to understand the world and our place in it.

Theoretical knowledge will always be incomplete, fallible, and revisable in the light of new evidence. This is because there isn't a direct correspondence between theoretical knowledge and the objects it explores, and because we use preexisting knowledge to understand what we see and to create new knowledge in exploring and increasing our understanding of the world (Bhaskar, 1998). There will always be a "gap" between our knowledge and the objects of knowledge, and knowledge will always be contested. Bernstein (2000) referred to this gap as the "potential discursive gap" (p. 30), arguing that it is the site where we can think the unthinkable, the impossible, and the not-yet-thought, and take our knowledge of the world in different directions. This is one reason why a curriculum that is based on tying contextually specific applications of knowledge to empirical objects denies students access to the systems of meaning they need to use knowledge in novel ways. Theoretical knowledge is socially produced by specialized communities. They develop the rules and criteria we use to frame our research questions and guidance for how we conduct our exploration. This is one way in which knowledge is given its "objective" character and the capacity to make judgments about competing knowledge claims (Young & Muller, 2013). This leaves plenty of room within disciplines for debate and controversy about the nature of truth, and students need access to the criteria the disciplines use for judging these knowledge claims.

The Difference Between Theoretical and Everyday Knowledge

Bernstein (2000) argues that theoretical knowledge differs from everyday knowledge because each is embedded in a different system of meaning. Theoretical knowledge is *general, principled* knowledge. It is organized as "specialised symbolic structures of explicit knowledge" in which the integration of knowledge occurs through the integration of *meanings* and not through relevance to specific contexts (Bernstein, 2000, p. 160). Bernstein refers to theoretical knowledge as *vertical discourses,* because meanings are situated within the symbolic structure of meaning rather than by their relevance to particular contexts. He explains, "The procedures of *Vertical discourse* are then linked, not by contexts, horizontally, but the procedures are linked to other procedures hierarchically" (Bernstein, 2000, p. 160). Some vertical discourses (such as physics) have hierarchical knowledge structures, and they share a knowledge base and develop through integrating propositions at higher levels of abstraction. The implications for curricula are that students need to understand the "before" to understand the "after" (Muller, 2006). If students don't understand the basic conceptual foundations, then they will not be able to enter the system of meaning. Other vertical discourses, such as the social sciences and humanities, are organized as "languages" rather than having a hierarchical knowledge structure. The implications for curriculum are that students need to recognize these languages and be able to differentiate between them. For example, in sociology, students need to be able to distinguish between functionalist and conflict perspectives and the different assumptions about society, power, and human beings that underpin each.

In contrast, everyday knowledge is *particularized* knowledge, because its selection and usefulness are determined by the extent to which it is relevant in a particular context. Everyday knowledge is the knowledge that we use in our interactions with our coworkers, family, and communities—our everyday "commonsense" exchanges. It is understandable only within the context that gives it meaning. This doesn't mean that it is unimportant; on the contrary, we couldn't get by without it. Bernstein (1999) explains that commonsense knowledge is the knowledge we use to make sense of the "common problems of living and dying" (p. 159). Everyday knowledge is also the tacit, context-dependent knowledge of the workplace. Bernstein (2000) explains that everyday knowledge is "likely to be oral, local, context dependent and specific, tacit, multi-layered, and contradictory across but not within contexts" (p. 157). For example, what may make sense at home or in church or a sporting club may not make sense at work.

Classification and Framing, and Singulars and Regions

There are other key concepts we need to explore to understand the nature of theoretical knowledge and its role in vocational curriculum. The concepts of *classification* and *framing* refer to the boundaries between different forms of knowledge, and the way it is organized in curriculum. Classification is the "what" of knowledge, whereas framing is the "how" of knowledge. The concepts of *singulars* and *regions* refer to the differences between "pure" and "applied" academic disciplines, how they are created, and how they are organized in a curriculum.

Classification refers to the structures of knowledge and the boundaries of insulation between them, and, in pedagogic terms, the way in which knowledge is presented in a curriculum (Bernstein, 2000). In a curriculum, *strongly classified knowledge* means that the boundaries demarcating one body of knowledge from another are clearly specified, so that students will understand, for example, that they are now studying sociology and not psychology. Weakly classified knowledge in curriculum means that these boundaries are not the organizing principle in structuring the curriculum. For example, it may be that students studying early childhood education are studying subjects that focus on child development and draw from sociology and psychology to focus on a particular problem or context, without signaling this to students. In this case, contextually specific insights from psychology and sociology are bundled together to understand the learning object in ways that are not visible to students. They don't have access regarding which insights come from sociology or psychology, and how they are linked to other concepts within sociology and psychology. Students need the *recognition rules* to be able to recognize different types of theoretical knowledge and the boundaries between them as the basis for understanding how theoretical knowledge is applied in specific contexts.

Framing refers to the way knowledge is selected, sequenced, paced, and evaluated in curriculum. Framing regulates forms of interaction, the locus of control over who can speak, and the pace, sequence, and form of this interaction. In particular, framing regulates the *evaluation rules,* or the ways in which students will be assessed. Strongly framed curriculum invests greater control in the teacher, whereas weaker framing invests students with greater *apparent* control over these processes. However, this control is only ever apparent, because a facility with using conceptual knowledge, understanding relations of progression, and, most importantly, understanding how knowledge is to be evaluated and assessed are preconditions for greater student control. Bernsteinian theorists argue that students from disadvantaged backgrounds do not have the same kind of access to these relations as do students from more privileged backgrounds (Muller, 2004).

Bernstein's early work focused on the way that knowledge is structured in a curriculum and how this conveys relations of power. He argues that the way in which knowledge in curriculum is classified and framed facilitates or denies students access to theoretical knowledge and consequently to whether they have access to the voice of power. He argues that relations of classification and framing most often exclude students from working-class backgrounds because they are not inducted into abstract, decontextualized language and meanings necessary to recognize boundaries and relations between concepts, and to be able to work within and across those boundaries. Arnot and Reay (2004) explain that the curriculum cannot be wholly acquired at school and that "Middle-class homes tend to provide an effective second site of acquisition" (p. 149), because they provide students with access to conceptual and abstract discourses that are congruent with school discourses. Bernsteinian theorists have argued that students from disadvantaged backgrounds do better when the curriculum is strongly classified so that these boundaries are not opaque, and where students have greater control over the pace of learning, but also where sequencing and evaluation are

strongly framed so that students have access to the progression rules within different bodies of knowledge and can "see" the way they are being evaluated.

It was only later in his life that Bernstein (1999) turned to focus on the nature of theoretical knowledge itself and how it is created, regulated, and elaborated, rather than how it was organized in a curriculum. His work here is not as developed as his work on knowledge relations in a curriculum, and those working within the social realist school and other theorists have been seeking to build on Bernstein's work (Maton & Moore, 2010).

Bernstein refers to the academic disciplines as singulars because they consist of singular knowledge structures that are distinguished from other academic disciplines. Academic disciplines are strongly classified bodies of knowledge because they have strongly insulated boundaries between them. For example, English is different from history, and both are different from philosophy. Each has specialized languages and rules that stipulate what is included as knowledge and how knowledge is to be created, with specialized texts, rules of entry, and authoritative speakers. Induction into an academic discipline is to be inducted into its "innerness," to the relations and structures of knowledge, and to the lens through which its object is understood. Bernstein (2000) says, "Singulars are, on the whole, narcissistic, oriented to their own development, protected by strong boundaries and hierarchies" (p. 52). He argues that socialization (and hence personal identity) is expressed through a commitment to loyalty to the academic discipline, which is a commitment to its "otherness."

In contrast, the purpose of *applied* academic disciplines is to understand problems, particularly problems that are posed in professional or occupational practice. Bernstein refers to the applied disciplines as *regions* because they are the interface between academic disciplines (singulars) and the field of practice for which students are being prepared (for example, medicine). Regions blend different concepts and frameworks from singulars, and the principle of selection and assemblage is to understand problems posed by practice. Regions consist of professional schools in universities and professional bodies and the way they interact to elaborate the knowledge base of practice and practice itself.

Bernstein argued that identities in regions are formed less through an inner orientation to knowledge, and more through an "outer" orientation to practice. However, as Beck and Young (2005) argue, the regions may give rise to an innerness in the formation of professional identities and "strong forms of inner dedication associated with certain of the established professions" (p. 187). They argue that this characterizes the "older" professions such as law, medicine, and engineering that have established communities of practice, collective collegiate autonomy, an identifiable knowledge base associated with professional training, and a code of ethics. These relations may be weaker in some of the newer regions such as tourism and information technology.

Relations of classification and framing in the applied disciplines are necessarily weaker than in the singulars because the orientation is toward practice; however, knowledge in the applied disciplines can still be classified strongly or weakly, and these relations in curriculum may be stronger or weaker. Knowledge that is strongly classified in the regions shares similar features to strongly classified singulars. In strongly classified knowledge, the boundaries between different fields of knowledge are defined and insulated, so that students will not confuse chemistry

with physics, or economics with sociology. Knowledge that is strongly framed in regions also shares similar features to strongly framed disciplinary knowledge. The selection, sequencing, pacing, and evaluation of knowledge are made explicit. Different elements of pedagogic practice may be strongly or weakly framed, so that students have greater control over the pacing of knowledge (weak relations of framing), and stronger relations of framing over the selection, sequencing, and evaluation of knowledge (the assessment). Strongly framed knowledge in vocational qualifications is more likely to be strongly sequenced, with limited student choice in the range of courses they can undertake.

An example of weak classification and framing is the current enthusiasm for problem-based learning (PBL) and experiential learning where the curriculum is organized around the problem rather than inducting students systematically into the different bodies of knowledge. This is supposed to reflect the messiness of practice that students will encounter in the field. However, in focusing on a contextually specific problem, PBL may not necessarily provide students with access to the systematic, specialist disciplinary knowledge that they need to understand different problems or to think about their particular problem differently (Whitcombe, 2013). This is a danger if PBL is the main principle structuring a curriculum, and it presents a particular problem for students who have not had a prior grounding in theoretical systems of meaning or the recognition rules they need to recognize conceptual frameworks. Students need access to the disciplinary system of meaning as a condition for using knowledge in contextually specific applications, and this applies to their practice in the occupations for which they are being prepared.

There is continuity of purpose between vocational education and education for the professions because both seek to induct students into a field of practice and the theoretical knowledge that underpins practice as the basis for integrating and synthesizing each. They differ from academic education (such as the liberal arts) because the purpose of academic education is to induct students into a field of knowledge. However, the nature of curriculum will also differ between professional and vocational education and between fields of practice within professional and vocational education. Muller (2009, p. 217) explains that there is not one kind of professional practice and that important curricular differences arise as a result. The body of knowledge underpinning practice varies in complexity, depth, and level of abstractness in different fields. Some curriculum will provide access to more strongly demarcated bodies of knowledge because this is needed as a precondition of practice, whereas others will have more emphasis on breadth of knowledge and contextual knowledge. However, while this is so, Muller argues that the conceptual demands of all occupations are increasing and access to conceptual knowledge is important for epistemological, economic, and social justice reasons.

How CBE/CBT Excludes Students From Access to Knowledge

The challenge for vocational curricula is to provide students with access to the theoretical knowledge that underpins vocational practice within a field, and to the tacit, context-dependent knowledge of the workplace. Trying to collapse

the distinction between each type of knowledge does violence to both. It also means that the distinction between an educational institution (such as a college) and the workplace as a site of learning is important. An exclusive focus on learning in the workplace denies students access to disciplinary systems of meaning, because, generally speaking, students have access only to contextually specific applications of theoretical knowledge in the workplace, and not to the system of meaning in which theoretical knowledge is embedded. This is because knowledge in the workplace is weakly classified and selected on the basis of its relevance. Similarly, an exclusive focus on learning theoretical knowledge in college does not provide students with access to the tacit, context-dependent knowledge of the workplace. *Both* sites of learning are needed. However, competency-based curriculum faces one way because it orients to the workplace, and students only have access to contextually specific applications of knowledge as a consequence of weak classification and framing. The discussion that follows here illustrates the way in which CBE and CBT exclude students from access to the theoretical basis of practice in occupations. It does so by first showing the task-focused orientation of Anglophone conceptions of competence, contrasting this with the broader Germanic notion of *Kompetenz*. It then uses the Australian definitions of *competency* and *CBT* to illustrate the narrowness of Anglophone conceptions.

Definitional Problems—Two Conceptions of Competence

A key problem with debates about CBE and CBT is that the notions of competence and competency have different meanings in international debates and in different national contexts. These differences reflect the different social and economic systems that mediate the relationship between the vocational education system and the labor market in different countries. In Anglophone countries, the notion of competency is tied to narrow notions of skill and work. This is a Taylorist task-focused concept in which training for an occupation consists of training for specific workplace tasks and roles. Clarke and Winch (2006) explain that in Anglo conceptions, skill is regarded as an individual attribute or property associated with tasks rather than the occupation as a whole. Skill is reduced to manual ability without having a particular association with a knowledge base. In contrast, the notion of *Kompetenz* in Germanic countries is tied to a richer notion of skill and work. *Kompetenz* involves a focus on preparing the individual for occupations that have a legal status and legal entitlements based on rich and encompassing notions of an occupation that include theoretical knowledge, practical and applied knowledge and know-how, personal attributes, and social dispositions (see also Chapter 4, this volume; Mulder, 2017).

Bohlinger (2007–2008) contrasts the Anglo and Germanic concepts of competence and *Kompetenz* to argue that Anglo notions are based on outputs comprising self-contained learning units for the purpose of certification, in which the basic idea is "the confirmation and certification of personal abilities and skills" (p. 106). She compares this to the input-oriented notion of *Kompetenz,* in which the basic idea is to prepare individuals "with a view to broadening knowledge and freedom of disposition" (Bohlinger, 2007–2008, p. 106).

In describing workplace tasks and roles, CBE and CBT tie learning to a description of work as it currently exists. This emphasizes tradition and is a brake on innovation and new forms of practice. This results in

> [a] rigid backward mapping approach, in which the state of the art on the shop floor is the untouchable starting point for the definition of occupational competencies, leading to routinised job descriptions, in which the proactive and reflective worker is left out. (Biemans et al., cited in Brockmann, Clarke, Méhaut, & Winch, 2008, p. 237)

In breaking down occupations into ensembles of tasks and requirements, there is no conception of an agent who over a period of time is involved in intentional activity, planning, and the exercise of discretion and judgment. Winch (2014, p. 569) refers to this as the ability to form and carry through projects in social contexts in which the formation of purposes takes place in engagement with others, and the requirements of the occupation and the workplace. In delocating theoretical knowledge from its system of meaning, CBT results in a curriculum focused on procedural knowledge in which the actor who is envisaged is the supervised worker, rather than an agential actor who exercises autonomy and judgment.

Not only does this approach to knowledge disempower workers, but also it contributes to fragmentation of the concept of work itself. The composition of units of competency is based on an atomistic conception of work and knowledge in which the whole consists of adding up (a lot of) parts. In breaking down units of competency into elements and performance criteria, work and the knowledge and skill needed for work are fragmented and atomized. In this conception, jobs consist of an ensemble of workplace tasks and roles. It assumes that workplace tasks and roles can be defined independently of other requirements and the theoretical basis of the occupation. Each unit competency stands on its own, and in the current Australian framework, the same unit of competency can often be used in multiple qualifications. Indeed, the use of the same unit of competency in multiple qualifications for different occupations is regarded as a key foundation of the system and supported because it putatively promotes portability between qualifications (Wheelahan, 2016).

CBT in Australia

The Australian vocational education and training (VET) system provides a clear example of the narrowness of Anglophone notions of CBT. In Australia, all vocational qualifications *must* be based on CBT. "Training packages" form the basis of the system and are developed for particular industries. Each training package has a number of qualifications made up of units of competency for specific occupations at different skill levels within an industry. Units of competency identify discrete workplace requirements. They specify "the standards of performance required in the workplace as defined in a training package," where *competency* "means the consistent application of knowledge and skill to the standard of performance required in the workplace. It embodies the ability to transfer and

apply skills and knowledge to new situations and environments" (Commonwealth of Australia, 2015, pp. 16 and 9).

The following example is taken from the Community Services & Health Industry Skills Council's (CS&HISC) Training Package. Units of competency comprise many elements, including an "application" section that specifies the work context in which the unit of competency will be applied and "who the unit applies to." Each unit of competency contains elements of competency that break the unit down into its contributing components, which "define the essential outcomes." Each unit of competency usually has several elements of competency, and each element of competency has several performance criteria that specify "the level of performance needed to demonstrate achievement of the element." Foundation skills (such as language, literacy, numeracy, and employment skills) must also be included. Finally, each unit of competency has assessment requirements that specify the "performance evidence," "knowledge evidence," and "assessment conditions" for satisfactory demonstration of competency (CS&HISC, 2015a, pp. 8–13).

Knowledge is included in the definition of competency, and the assessment requirements in each unit of competency include "knowledge evidence" that "Specifies what the candidate must know in order to effectively carry out the performance criteria" (CS&HISC, 2015a, pp. 8–13). However, "knowledge evidence" consists of theoretical knowledge that is reduced to lists of topics, including conceptual knowledge and procedural knowledge, that are in no particular order and with no particular relationship to each other. There is no hierarchy of concepts or identified relationships between concepts. Barnett (2006) explains lists of topics are a means of ordering information that "suppresses any knowledge structure that the subject may possess" (p. 150). In other words, students are not inducted into *systems* of meaning and the relationships between concepts.

Moreover, knowledge is always tied to the specific. For example, a CS&HISC (2015b) knowledge guide explains how knowledge is to be included in units of competency:

> When trying to determine the range and breadth of knowledge required of a candidate, the most important consideration is the context of the performance criteria. That is:
>
> - how does the knowledge relate to the task
> - what level of knowledge underpins the task and
> - what range and scope of knowledge has been specified in the assessment requirements? (p. 6)

This shows that knowledge must be tied to specific contextual applications in the workplace as specified by the elements of competency and performance criteria. Tying knowledge to the elements of competency and performance criteria ensures that students only have access to conceptually specific applications of knowledge, and not theoretical systems of meaning. This is because knowledge is distinguished by the way in which it is applied *at work* and not by *systems of meaning*. It delocates specific applications of knowledge from the

applied academic disciplines, which underpin professional and vocational practice. Students have access only to contextually specific elements of theory that are relevant to the particular context, so that the emphasis is on elements of content rather than the system of meaning. It results in weak classification of knowledge because the boundary between theoretical and everyday knowledge is not visible. Moreover, it does not give students access to the boundaries that define the applied disciplines, because knowledge that is included draws from several disciplines without distinguishing each. It results in weak framing because it does not distinguish contexts of learning by privileging workplace learning, or by stipulating the sequencing of knowledge. It translates knowledge from being general and principled knowledge to particularized knowledge, because its selection and usefulness are determined by the extent to which it is relevant in a particular context.

Access to knowledge is further undermined by the assessment criteria. A key principle in CBT is that assessment should be "authentic" and focus on the demonstration of skills in the workplace or in settings that simulate the workplace. Assessment is based on demonstrable performance, and knowledge is *inferred* from these performances. It assumes there is a direct line between knowledge, task, and assessment. This is based on behaviorist premises that learning can be directly assessed through observable performance. This underplays both the complexity of the workplace and the context in which actions take place, and the complexity of learning. It is based on the simplistic premise that the conditions of learning are external, what is to be learned is a given, and the processes of learning are identical with the skills that are to be learned. However, this underplays the complexity of learning and the resources that people bring with them when engaging in tasks. While there can be no learning without doing, underlying capacity lays the basis for new learning. This is widely recognized in the case of language, literacy, and numeracy, but less acknowledged when it comes to systematic access to theoretical knowledge.

Hodge (2014) explains that a key behaviorist assumption underpinning CBT is that the description of the outcomes will mean the same regardless of the reader, who "will be able reproduce the intention of the writer in their own mind with little or no distortion or loss" (p. 13). Making sure that everyone is "on the same page" has proved difficult in practice, and the end result is pages of specification to elaborate the different components of units of competency. This is necessary to tie down meaning, but in the end, it is an elusive goal because it is not possible to tie down meaning so that everyone understands it in the same way and so that it means the same outcome is applied everywhere. Such detailed specification is required because units of competency describe the outcomes of learning independently of the processes of learning, and this process of specification encourages reductive processes of learning that "tick off" outcomes, rather than holistic learning.

As an illustration, the following discussion compares the Advanced Diploma of Business offered as a vocational education qualification with the Associate Degree in Business, the equivalent higher education qualification. According to the Australian Qualifications Framework, an advanced diploma and an associate degree are equivalent as they are at the same "level" (Level 6). Even though both

qualifications are preparing students for a loosely defined field of practice (business), there are marked differences in the way they provide students with access to knowledge.

The Advanced Diploma of Business requires students to undertake eight elective units of competency, and they must select no more than three units of competency from four groupings of competencies. There is no mandated core list of competencies, which reflects very weak framing. The competencies in each of the groupings are based on a workplace task, role, or requirement. An example from each group, respectively, is as follows: Develop an advertising campaign, lead and manage organizational change, manage international marketing programs, and manage finances. This shows very weak classification, as the curriculum is organized by workplace requirements, and not by clearly indicating applied disciplinary boundaries.

In the Associate Degree in Business, students must complete 16 courses over 2 years. Although some courses seem to be more "applied" than others (such as Prices and Markets, and Business Computing), many orient students to identifiable bodies of knowledge in the applied disciplines (such as commercial law, marketing principles, macroeconomics, and human resource management). Classification is stronger and organized according to knowledge structures, and framing is stronger as students must take a mandatory core in each of the 2 years of the associate degree.

Although it would be possible to argue that relations of classification and framing in the associate degree are weaker than in associate degrees that prepare students for more sharply defined fields of practice (for example, engineering), it nonetheless provides students with the tools to distinguish between different applied disciplines even if there may be some overlap between them (for example, macroeconomics 1 compared to financial accounting).

The Move to CBE and Learning Outcomes in North America

In many cases, the implementation of learning outcomes and competency-based models in different countries has occurred through policy borrowing, rather than policy learning (Allais, Raffe, & Young, 2009). This is deeply problematic because the policies that are borrowed are reproduced in new countries that take no account of the social, cultural, political, and institutional frameworks in which the policies were first developed. However, the *absence* of policy learning is problematic, and this is what seems to be happening in North America (particularly the USA) in its headlong rush to embrace learning outcomes and CBE. North America could learn a great deal from the experiences of other liberal-market Anglophone countries, because they have similar political systems, economies, and systems of education.

CBE is moving from the margins of the higher education system in the USA into the mainstream, and competency-based degrees (and associate degrees) are

becoming more commonplace (Klein-Collins, 2013). Support for CBE is being driven in large part through philanthropic trusts such as the Lumina Foundation and the Bill and Melinda Gates Foundation (Ward, 2016). The US Competency-Based Education Network, which comprises 30 colleges and universities and four public systems with 82 campuses, is participating in a Lumina Foundation–funded project aimed at developing "high-quality competency-based education capable of serving many more students of all backgrounds" (Competency-Based Education Network, 2017).

While there are some voices that are raising concerns in North America (Ward, 2016), overall the debate seems remarkably one-sided with voices for CBE in the public policy discourse drowning out opposition. CBE is seen as a tool to revolutionize both higher education and the workforce (Weise & Clayton, 2014). One exception to this, at the time of writing, is a project conducted by the Ontario Council for Articulation and Transfer (ONCAT) in Canada. ONCAT has sought reflections by international scholars familiar with other Anglophone countries' experiences with CBE and plans to publish them, along with commentaries from practitioners about the implications for policy and practice, in Ontario.

Opponents to CBE are cast as defenders of reactionary tradition, particularly teachers and institutions that are resistant to change (Dragoo & Barrows, 2016). This is also very familiar to other Anglophone traditions, with teachers being blamed for holding back progress (Wheelahan, 2010). Being an opponent of CBE does not necessarily entail being a supporter of conservative approaches to curriculum that valorize the "canon" as the voice of authority. A third position is possible. It is possible to argue for an approach to education (VET) that is progressive precisely because it helps students gain access to the knowledge they need to navigate an uncertain world, including and particularly students from disadvantaged backgrounds who have been denied access to this knowledge in unequal education systems (Young & Muller, 2010).

It is simply not credible that one model of curriculum such as CBE can achieve all the outcomes that are attributed to it. And, it has demonstrably proven to be unrealistic in other Anglophone countries and systems influenced by Anglophone models (Allais, 2014; Wheelahan, 2016). Brown (2011) argues that the implementation of CBT and learning outcomes models in England has been a policy failure:

> [T]he major lesson to be learned is that a focus on competence, mapping qualifications, levels, and outcomes can become a distraction from the much more challenging goal of improving the quality of teaching and learning. Shifting attention to a developmental approach to the development of expertise may prove to be more effective by highlighting the importance of the processes of learning and the need to support the development of expansive learning environments in education, training, and employment. (p. 36)

These are important lessons that could inform the debates in North America.

Conclusion

North America can learn a great deal by examining the experiences of Anglophone countries such as England and Australia that have attempted to implement CBE and CBT models of curriculum. Failures can be just as informative as successes in policy learning. The development and spread of CBE in North America are proceeding in the absence of any policy learning from systems that have tried and failed to implement CBE and CBT. In those countries, CBE and CBT is a second-class option offered in institutions that serve working-class students and disadvantaged populations. It results in the reproduction of social inequality because it does not provide students with access to the knowledge they need to be full participating members in debates in society and in debates in their occupational field of practice. A Bernsteinian analysis of the nature of knowledge and of CBE demonstrates that it is the *structure* of CBE and not just the content that results in this outcome.

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Part II

The Political Economy of VET

7

Political Economy of Vocational Education and Training

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Introduction

The primary concern of political economy is the production, distribution, and exchange of goods and services in human society. Political economy emerged as a distinct intellectual discipline in the late eighteenth century to understand these matters in societies where "the market" operates as an identifiably distinct domain, separate from other parts of social and political life (Desai, 2002; Herman, 2001; Polanyi, 1944). From the outset, controversy has reigned in the discipline. How is "the market" conceived? What is its relationship with the state? What role do (and should) other social entities, such as organizations of employers and workers, play in shaping production, distribution, and exchange? Traditions within political economy differ primarily on how the market is conceived. Arguably, the greatest schism concerns whether markets are regarded as being independent, self-regulating arrangements, or a domain that cannot be understood (or operate effectively) without activity from the state and other social entities.

Vocational education and training (VET) is the latest terminology used to describe a highly fluid and contested social space. In educational systems, it is the territory between secondary schooling and universities. In the labor market, it is the space between jobs requiring few skills and professional occupations requiring deep and highly abstract underpinning knowledge. When conceived in this way, VET has played a prominent role in the political economy literature of labor; conversely, the various approaches to political economy have made a contribution to understanding how VET systems have developed and the functions they serve. This chapter reviews how three of the major contemporary schools of political economy analyze VET: human capital theory (HCT), institutionalist approaches, and the capabilities approach. It seeks answers to some of the key questions in VET, such as who controls VET and how it is delivered and financed.

Dramatic changes in the nature of both the supply and demand for skilled labor—especially at the intermediate level—are challenging the nature and role of VET. The emerging intellectual current within political economy known as the *capabilities approach* provides new ways of conceptualizing the key issues. Key insights from this emerging literature are provided in the penultimate section, and a brief conclusion synthesizes the common themes from the chapter.

Human Capital Theory

The theory of human capital has been highly influential in the study of the economics of education since its inauguration by Becker (1964). Its hypothesis is that education is an investment by individuals, which produces future income. Education generates higher lifetime wages, by enabling the acquisition of knowledge and skills—human capital—and increasing the productivity of the individual. The theory posits that individuals receive higher wages equivalent to their marginal product—a direct result of their investment in human capital. HCT features a number of assumptions—the most fundamental being that wages reflect differences in individuals' productivity. Closely allied to this are assumptions about the prevalence of a perfectly competitive labor market, including: (a) Firms must have perfect knowledge of worker characteristics (i.e., that they observe the improved productivity); (b) workers and jobs are perfectly mobile across geographic areas; and (c) there is sufficient (indeed, perfect) competition between both workers and employers to ensure that wages reflect productivity differences, and not labor market power. A single employer in a small mining town, for example, would have no incentive to reward improved productivity if no competing employer could credibly offer a better paid job elsewhere.

HCT posits that the length of time invested in education is influenced by an individual's characteristics, including their initial ability. It predicts that individuals will choose to invest in human capital at the outset of their working life, and not to invest in fresh training later in life. It predicts also that those who are more efficient at becoming educated—assumed to be related to ability—will invest the longest amount of time in education. Early theoretical models (such as Becker, 1964) argued that heterogeneity in abilities largely explained educational behavior and the wage income that ultimately flowed from it. HCT has been the foundation of a large body of empirical research reporting on the private "returns to education" (see also Chapter 10, this volume). By estimating an "earnings function," a regression framework first set out by Mincer (1974), these studies have sought to establish whether the correlation between education and earnings is in fact the causal relationship predicted by HCT—that increases in skills and knowledge do in fact drive increases in lifetime wages. The earliest of these studies related years of schooling to wages (Mincer, 1974) and found that schooling explained very little of the variation in income.

Later studies examined more than just years of school and recognized human capital accumulated through things like the attainment of postschooling qualifications (Jaeger and Page, 1996) and on-the-job experience (Brunello & Simona, 2004). They have also sought to better quantify schooling quality

(Altonji & Dunn, 1996; Card & Krueger, 1992) and the impact of natural abilities via the measurement of cognitive and other skills (Heckman, Stixrud, & Urzua, 2006; Murnane, Willett, & Levy, 1995). Reviews of international studies relying on the most robust methodologies (including the use of natural experiments and twins) suggest that the return to an extra year of school is between 8% and 10% (Ashenfelter, Harmon, & Oosterbeek, 1999; Psacharopoulos & Patrinos, 2004), although estimates vary significantly over time and by country, gender, and methodology. Recent research published by the World Bank has highlighted just how significantly such rates of return differ for general schooling (Montenegro & Patrinos, 2013). These findings highlight the importance of context, and especially matters beyond the supply side, which we examine in later sections of this chapter. These empirical studies have flourished despite substantial measurement problems compromising their potential to definitively support their predictions (Leuven 2005). These problems include (a) that worker productivity is rarely observed or measured, and using wages is a very weak proxy; (b) that, in general, studies ignore the degree of competition prevailing in a market for skills, which can produce misleading conclusions about the magnitude of return to different types of skill; and (c) the stock of human capital itself is difficult to measure.

Becker (1964) distinguished between "general" and "specific" training. General training is that which enhances the individual's productivity for all jobs, whereas specific training enhances productivity for one particular type of job. HCT posits that an employer has no incentive to invest in general training, as they cannot reliably recoup the investment because the employee may be poached and/or choose to work elsewhere. As such, HCT predicts that the cost of general training—including study expenses and potential loss of income—will be borne wholly by the individual, who in turn is the only beneficiary. Individuals are able to invest in general skills by accepting wages below their productivity during training periods. Contrarily, employers may choose to share in the cost of specific training, because workers are less able to benefit from competing employers upon completion of specific training, and the payoff is more likely to accrue to both the employer and employee. HCT explains empirical observations of employer-sponsored training as relating only to specific skills, or employees accepting lower wages during training.

Evidence contrary to these predictions shows that firms do indeed incur significant training costs where the skills are not firm-specific and are, instead, of a general or industry-specific nature. For example, the German apprenticeship system comprises training in general skills, and completion includes examination by an external board (Soskice, 1994; Steedman, 1993). Acemoglu and Pischke (1999b) review German studies showing that employers do indeed incur a net cost in providing general training to apprentices. Other studies in the USA show that in firms providing temporary clerical services, training is provided by the "temping" firm, despite the employees having no contractual obligation to the firm (Autor, 2001; Krueger, 1993).

Such empirical evidence challenged economists to develop theories more consistent with the observed patterns of investment in general training. Acemoglu and Pischke (1998, 1999a, 1999b) argued that a range of imperfections in the

labor market can result in a compressed wage structure—that is, workers are paid a lower return to skill than in a perfectly competitive market—and that this gap between productivity and pay is greater for higher skilled workers. In this case, employers may profit from investment in general training. Acemoglu and Pischke's model predicts that in economies where labor institutions may act to compress the wage structure (e.g., Germany and Northern European countries), there may be higher levels of firm-sponsored general training. International empirical evidence does indeed show correlations between higher levels of employer-sponsored training in more regulated labor markets such as in some European countries and Japan (OECD, 1994).

There can be benefits to a society from having a workforce that is highly skilled—benefits that may not be immediately apparent to individual workers or firms. It has long been recognized there are "public good" benefits from having a population with high levels of literacy and numeracy, for example. Similarly, in VET, there are public good benefits from having a workforce trained in transferable skills, providing a skilled labor resource of benefit to a wide range of potential employers. It is because of this that governments in many nations are involved in the public provision of VET and/or the use of training subsidies to encourage investment in skills. However, where monitoring or contracting for the amount or quality of workplace training is difficult or impossible, training subsidies may become a windfall gain to the employer. Alternatively, the direct provision of training by government can be problematic because it may lack any complementarity between training and production, and not meet the needs of businesses or trainees. Acemoglu and Pischke (1999b) suggest that a combination of subsidies and regulation are necessary to successfully raise training levels. Such regulation usually concerns the quality of training programs and the certification of skills, and immediately raises questions regarding the institutional arrangements required to oversee the regulatory regime.

Labor Demand and VET

The deficiencies in its understanding of employers' engagement with training and issues of skills and credentials regulation are symptoms of deep weaknesses in the HCT approach to VET. The neglect of employer dynamics arises from naive assumptions about labor demand. The problem of credentials regulation arises from its neglect of the crucial institutional determinants of skill content and quality. The demand for labor is not fixed and varies over time, particularly with the advent of new technology and rising levels of income (Pasinetti, 1981). The default assumption, especially among policymakers, is that this leads to an increase in the demand for skilled workers, because technology can be used to automate low-skill work. Braverman (1974), however, argued that deskilling was the logical and inevitable consequence of capitalist production, which profits by using technology to erode the discretion required by workers in production, thereby increasing managers' ability to control workflows and eroding workers' bargaining power. More recent studies have revived the Braverman thesis, predicting a new wave of automation that is threatening to wipe out up to 40% of

jobs that do not require creative application and that are vulnerable to routinization (Durrant-Whyte, McCalman, O'Callaghan, Reid, & Steinberg, 2015). Perhaps the strongest body of research supports the idea of an hourglass economy: a growth in high-skill jobs (typically requiring a university degree), with low-skill service jobs that cannot be mechanized also remaining. This leaves VET as part of a "squeezed middle" of disappearing intermediate-skilled jobs.

There is more consensus in the literature, however, that the nature and types of skills demanded of workers are changing. With the growing dominance of service sector employment and its focus on human interaction, and rapid changes in technology, more emphasis is being placed on so-called *soft skills* (presentation and attitude) and *generic skills* that allow workers to adapt to changing circumstances, with less emphasis on technical skills (Grugulis, Warhurst, & Keep, 2004). However, some would contend that these complement, rather than displace, the need for specific occupational skills (Bosch & Charest, 2010; Buchanan et al., 2001; Mournier, 2001; Wheelahan, Buchanan, & Yu, 2015).

These dynamics in labor demand have significant implications for VET. By definition, and to a much greater extent than in other education sectors where social and citizenship justifications receive greater prominence, the commonly understood purpose of VET is to provide the economy with workers who possess skills that are relevant for production and/or service provision. To understand the demand for VET, it is necessary to understand how labor markets are structured and governed. Labor's contribution to production or service provision is inherently indeterminate. When an employer hires labor, they do not buy an object (i.e., actual labor), but rather labor potential (i.e., the capacity to perform). The gap between potential and actual performance creates a significant uncertainty for employers. How good will labor hired actually be on the day? Will work be conducted at desired levels of quality consistently and in a reliable fashion? Because of that uncertainty, and an imbalance of power between parties, institutions play a central role in shaping the character of labor demand and how it is deployed in the workplace (Fox, 1974, p. 188).

Understanding skill, therefore, requires attention to be devoted to a far wider range of variables than those that preoccupy HCT. How these aspects of VET operate are of central concern in the extensive alternative literatures to HCT, especially the literature that can be categorized broadly as fitting within the *institutionalist approach*.

Institutions and VET

Although there is great diversity in institutionalist approaches, a common underlying characteristic is that they look to the broader socioeconomic context to explain why and how VET is structured and operates across countries and across time. The modern—more accurately, *neo-institutionalist*—approach is concerned principally with understanding the role of institutions in skill definition, formation, and use. "Institutions" concern an "array of non-market actors (including the state, formal corporatist associations [and] informal but deeply rooted inter-firm networks" (Crouch, Finegold, & Sako, 1999, p. 23). An alternative definition of

institutions is "a set of rules, formal or informal, that actors generally follow, whether for normative, cognitive or material reasons" (Hall & Soskice, 2001, p. 9). What distinguishes the neo-institutionalist approach from the Beckerian neoclassical economists is the assumption that "institutions have an irreducible *sui generis* role in determining human action" (Crouch et al., 1999, p. 23). In other words, the effect of institutions is more than the sum of the individual decisions made by actors operating within them.

Understanding institutions is important because they connect VET to the product market. They are also vital for addressing the public good challenge noted earlier in this chapter. As Streeck (1992) puts it, a flexible, high-skill workforce can fully develop only with VET institutions "that complement and control free markets and hierarchical property rights" (pp. 25–26). Institutions also connect VET to other related social and economic systems: industrial relations, schools and higher education, migration, and social welfare (Bosch & Charest, 2010, p. 2), with key actors such as trade unions exercising power across multiple systems (Streeck, 1992). Institutions provide "capacities for the exchange of information, monitoring, and the sanction of defections relevant to cooperative behavior among firms and other actors" (Hall & Soskice, 2001, pp. 10–11). They are also a place for values to influence VET and to mediate change.

Varieties of Institutionalism

Recognition of the importance and role of institutions in VET pre- and postdates the ascendancy of HCT. Indeed, it is arguably one of the enduring concerns of political economy since its emergence from moral philosophy in the late eighteenth century. Adam Smith's *Wealth of Nations* (1776/1976), for example, begins with a reflection on the economic benefits of task specialization for productivity. He also dwells on the social costs of this development for workers. Smith regarded such a division of labor as a natural, technical necessity (Murphy, 1993). Echoes of this approach inform modern notions of market-based global competition "necessitating" changes that deliver a production regime that is economically sustainable. But although economic competition necessitates change, it does not dictate its form. A considerable social science literature has emerged since Smith's time, which has revealed how social factors ultimately determine the division of labor that prevails in any particular country at any particular time. In recent years, arguably the most influential school of thought within this tradition has been the Varieties of Capitalism (VoC) literature (discussed in detail in Chapter 8). The VoC approach is one response to the view that increasing global market competition is so dominant that all economies are converging on a neoliberal market model of economic development (e.g., Baccaro & Howell, 2011; Streeck, 2009). It has not, however, been the only response to the HCT ascendancy. It has been criticized for being too broad to usefully delineate the extensive diversity and highly variable rates of change in advanced market economies (see, for example, Crouch, 2005). Across the globe, VET systems are not usefully characterized as falling into one of two general forms. Even within single countries, there is frequently not one VET system, but an overlapping patchwork of different institutions run by state agencies, firms, chambers, and local agencies

(Bosch & Charest, 2010, p. 2). As such, ascribing a country to a limited set of categories can reflect no more than a "dominant tendency"—rarely, if ever, can countries be accurately described as being characterized by one of two all-pervasive organizational logics (Wheelahan, 2015, p. 130).

Crouch et al. (1999, p. 25) identify five dominant forms of skills provision in VET:

1) Direct state
2) Corporatist networks
3) Local firm networks
4) Institutional companies
5) Free markets.

This richer typology means that they can compare and explain differences between the VET models based on corporatist networks in Germany and the local firm networks that provide some VET in Italy and Japan. The German chambers of commerce may be authoritative, but the corollary can be that they are slow to adapt if they are required to consult extensively among their members, who may occupy different parts of the product market; this is where the informal networks may have an advantage. The typology also provides more scope to focus critically on the capacity of the state to provide VET. Crouch et al. (1999) conclude that the state-led systems providing specific vocational courses are the least well suited to creating "learning societies" in a time of rapidly changing skills and technology because they are "too removed from the enterprise" (p. 219).

Similar points have been made by Green (1999, p. 67). A strength of his typology is the prominence given to countries outside Europe and North America. His five models are (a) the "state developmental" model found in East Asia, (b) the "social market" model of Germany and surrounding countries, (c) the "social democratic model" of the Nordic countries (which can be distinguished from the social market model by the state taking an active role in directly providing a wide variety of training and not primarily supporting an employment-based apprenticeship model), (d) the liberal model of the Anglo-American tradition, and (e) a "Republican model" featuring France and other Latin states (Green, 1999, p. 67). Similarly, Sung, Turbin, and Ashton (2000) describe four models: (a) the "market model" of the Anglo-American tradition; (b) the "neo-market model" found in rapidly developing countries in South America and elsewhere; (c) the corporatist model of Central and Northern Europe; and (d) the developmental state of East Asia.

Understanding Change

Perhaps the greatest limitation of all of the approaches discussed here is that typologies are static—they give no indication of how the institutional arrangements came to be and how they might continue to evolve over time. Any understanding of how institutions evolve requires a historical perspective. Thelen (2004), for example, details the evolution of the German, British, US, and

Japanese skill formation systems as critical features of different trajectories of industrialization. Her historical analysis reveals the determining role of the state at key moments: backing the artisanal model of skill production in Germany, while seeking to undermine it in the UK, the USA, and Japan. Thelen (2004, pp. 35–36) argues that there are two means by which institutions evolve over time: (a) *institutional layering*, whereby new elements are grafted onto an otherwise stable framework; and (b) *institutional conversion*, in which new goals for the institution are adopted or the incorporation of new groups changes the functions or role of the institution. Thelen cites, as an example of the former, the replication of the artisan apprenticeship model and its craft-based training arrangements in the rapidly growing industrial sector in the nineteenth century. The later incorporation of the industry-based trade unions into the system in the early twentieth century is an example of the latter. Recently, Thelen (2014) has moved beyond the limited categories of VoC to understand the divergent paths experienced by the VET systems (alongside the labor market policies and collective bargaining frameworks) of two countries normally classified as being coordinated market economies [CMEs]—Germany and Denmark. Thelen identifies the key variables as being the extent of interest group involvement (both employer associations and trade unions) in the fast-growing service industries in the two countries, and the willingness of the state to intervene by nudging social actors. Employer coordination is necessary but not sufficient. The reason Denmark has achieved a more solidaristic form of liberalization—what she terms "embedded flexibilisation" (Thelen, 2014, pp. 30–32) is because of a higher level of union organization and activity in the service sector (especially representing female workers) and a greater willingness by the Danish state to encourage employer action through high levels of welfare and an advanced continuous vocational education and training (CVET) model that does not discriminate between workers in jobs and the unemployed. In contrast, German actors are sustaining the institutions of VET, but employers in the service sector are free to opt out, leading to "dualisation": Insiders in the manufacturing sector remain largely committed to the old model, but others are opting out. The lesson is that it is important to disentangle expressions of social solidarity (which are essential to an inclusive model of collaboration) from the traditional coordinating institutions. Institutional forms cannot be static, because the coalitions of political support that sustain them are not.

Skills Ecosystem

A feature common to much of the recent institutionalist literature on VET has been its focus on developments at the national level. In critiques of earlier incarnations of this literature (i.e., that concerned with so-called "low-skill" and "high-skill" equilibrium economies), Finegold (1999) argued that such characterizations of national experience were inaccurate. So-called high-skill economies like Germany had low-skill pockets, and so-called low-skill economies like the USA had high-skill pockets such as Silicon Valley with its famous information and communication technology (ICT) and biotech hubs. Finegold argued that in making sense of these realities, it was better to devote attention to what he referred to as "skills ecosystems" within and across countries. These existed at

either regional and/or sectoral levels. For Finegold (1999), *high-skill ecosystems* exhibit the following characteristics:

- A catalyst to drive growth
- A supportive host environment
- A high degree of interdependence between the constituent actors
- A source of nourishment.

Although broad, national-level education and training settings play some role, high-skill ecosystems can exist at a regional level in both liberal market economies (LMEs) and CMEs, provided the right mix of characteristics relevant to the region's production approach is in place locally. Nourishment may come from supportive hosts, from state institutions, or through more informal collaborations of local firms and training providers.

As Payne (2008) notes, a skills ecosystem can be both a policy ideal type and a frame of analysis for understanding both high-functioning and poorly performing systems. As an ideal type, Hall and Lansbury (2006) argue the skills ecosystem model provides a middle road between the shortcomings a market-dominated approach (namely, a high risk of underprovision of skills) and a centrally coordinated state-dominated or social partnership approach (which is slower to adapt and requires employers to cede considerable influence to the state and/or unions). Buchanan and Jakubauskas (2010, p. 45) reported on research that has applied the concept to low- and mid-range skills ecosystems. In doing this, they adopt a slightly different formulation from that of Finegold, arguing that a skills ecosystem comprises:

- Business settings (i.e., relevant product and capital markets)
- Institutional and policy frameworks
- Predominant modes of engaging labor (e.g., casual employment)
- The structure of jobs, including job design and work organization
- The level and type of skills formation (e.g., apprenticeships).

The key insight of the skills ecosystems approach, especially in comparison to HCT, is that it focuses attention on the employer demand for skills and the factors that shape it. On a practical level, the concept of a skills ecosystem provides a framework for a demand-led model of VET, albeit by encouraging input from clusters of local firms (Froy, 2013) rather than individual employers (the unit of analysis for classical economics). The approach broadens the purpose of VET from a sterile conception of human capital as a fixed input to include reconsideration of how skills are utilized by firms as well as delivered (Payne, 2008).

Like the VoC literature, the skills ecosystem approach emphasizes the connections between VET and other policy domains. The analyses of skills ecosystems in multiple countries conducted by the OECD located successful skills ecosystems within a broader economic development agenda, which addressed schools and welfare on the supply side and innovation, industry policy, and industrial relations on the demand side (Froy, 2013, p. 352). The skills ecosystems approach has particularly demonstrated the link between VET, innovation, and economic growth at the regional and national levels (Edwards, Battisti, & Neely, 2004; Froy, 2013, p. 349).

One potential weakness of the skills ecosystem approach is that a focus on understanding employer demand does not overcome the high likelihood of market failure in the provision of VET (Cooney & Long, 2014). A skills ecosystem approach still emphasizes the place of VET in a broader general education system, including primary and secondary schooling (Froy, 2013, p. 348). As a range of skills ecosystem pilot projects in Australia demonstrated, even with additional public investment, overcoming systemic economic and business pressures to move clusters and regions toward high-skill equilibria is difficult (Payne, 2008, p. 313). For example, Buchanan, Evesson, and Briggs (2002) identified excess productive capacity to be at the start of a chain of factors that led to the breakdown of the skills ecosystem in manufacturing in the Australian State of Victoria in the early 2000s. Excess capacity spurred intense competition between providers, putting pressure on profits. In response, cost reduction strategies included reducing the intake of apprentices, outsourcing, and labor hire. Work intensification among the remaining workforce reduced the time available for on-the-job training. What training did occur was narrowly focused on the competencies required by that worker for that job, reducing the ability to redeploy workers as circumstances changed. The result was a limited capacity to handle new skill requirements that would emerge with industry transformation and looming shortages for existing skills. Similar dynamics were observed in other industries in Australia: dairy farming, community services, and public hospital emergency departments (Buchanan & Jakubauskas, 2010, p. 48).

Critical Issue I: Why Are Employers Often Reluctant to Invest in VET?

The skills ecosystem approach, along with the other institutional approaches, provides insights into why employers are often reluctant to invest in VET. In common with neoclassical economics, neo-institutionalists see the provision of vocational training (particularly that associated with the development of transferable skills) as a public good. Employers have an incentive to invest in the skills of their workers, in order for their firms to be more productive (see Chapter 10). However, if those skills are of value to other employers (i.e., if they are general rather than firm-specific skills, to use the Beckerian formulation), then there is a high risk of poaching, because a firm has an incentive to pay a premium to workers who are already trained (assuming the premium is less than the cost of training the worker).

A good example of this problem is provided by the operation of apprenticeship systems. Apprentices are usually a net cost to the business, at least in the initial years (Culpepper & Thelen, 2008). To succeed, the apprenticeship model requires a commitment from employers large enough to overcome multiple risks: of the apprentice not being suitable, the apprentice quitting before completing their training, or the apprentice being poached at the end of their training by an employer that has not invested the time or money in taking on apprentices themselves. To an extent, the education system is mutually reinforcing, because the apprenticeship model instills a strong sense of pride in the occupation that employers who have gone through an apprenticeship themselves are keen to reproduce. The extent to which apprenticeship systems emerge and survive

depends greatly on how well the public good (or collective action) problems associated with training in transferable skills are overcome. In Germany, for example, the power accorded employer associations allows them to police free-loading and share costs to an extent (although the power of employer associations is waning). The coordinating role of the employer associations also facilitates ongoing employer input into the design, delivery, and assessment of vocational qualifications. Such collective institutions have not been as strong in countries such as the UK and Australia. Both countries once had vibrant traditions of apprenticeship in the craft trades, but today, especially in the UK, they lack many of these preconditions that exist in Germany. As a result, apprenticeships must increasingly compete with higher status university pathways to the labor market. Generally speaking, these are quite fluid, mitigating against the formation and reproduction of strong occupational identities, and corporatist structures are quite weak, reducing the power of employer associations (and trade unions through collective bargaining) to deter freeriding.

Changes in labor demand are exacerbating this dilemma. Firms need autonomy, yet there is an increasing reliance on general skills; no country that relies on "autonomous company initiative" is producing an upskilled workforce (Crouch et al., 1999, p. 226). This is a manifestation specific to VET of a more common modern dilemma: "the problems we confront increasingly require collective solutions, but the biases of political and economic action increasingly reject collective action" (Crouch et al., 1999, p. 8).

Critical Issue II: How Is VET Financed and Delivered?

Neo-institutionalist approaches to understanding how VET is financed and delivered begin with an examination of who controls VET. The institutional frameworks governing VET are the outcomes of cross-class compromises that have taken different forms in different countries (Culpepper & Thelen, 2008, p. 42). As the evolution of the German apprenticeship system discussed in this chapter shows, "institutions frequently outlive their founding coalitions and their endurance and robustness often involves a reconfiguration of their coalitional base" (Thelen, 2004, p. 33). Bosch and Charest (2010, p. 18) argue that a reason for the sustainability of the German and Danish arrangements is that trade union involvement is either at the federation level (Denmark) or by strong national industry-based unions (Germany), ensuring that the unions represent the interests of multiple occupations and semiskilled and unskilled workers and are not tempted into establishing rigid occupational boundaries. Diffused power arrangements, or arrangements that give veto power to social partners, can still lead to change over time even if the formal institutions remain unchanged, as the ongoing reforms to the apprenticeship system in Germany demonstrate (Thelen, 2009). Corporatist models are not necessarily less complex, because state-controlled systems must develop their own arrangements for adapting to changing economic and social conditions and ensuring accountability (Oliver, 2011).

Across systems, some method of sharing the costs of VET among employers, learners, and the state must prevail. Subminimum wages are commonly paid to

apprentices, as in Germany, where apprentices typically receive one-third of the average wage of a VET-qualified worker (Bosch, 2010, p. 150), and Australia, where the discount is smaller and varies with age (Oliver, 2011). In Germany, apprentices may also be eligible for a government grant (Bosch, 2010, p. 151). The state typically funds the costs of VET schools (either directly in the case of public institutions, or indirectly through subsidies paid to private and not-for-profit providers).

Levies are common in some industries (e.g., construction) across countries with very different institutional arrangements (Bosch, 2010, p. 153; Clarke & Herrmann, 2004), but compulsory levies are fiercely resisted. The Australian training levy, for example, did not last long (Hampson, 2004). Crouch et al. (1999), p. 236) are optimistic about the ability of levies to provide at least a one-off boost to VET provision if the training is linked to national skills standards, but they acknowledge the risk that the effort may not lead to productive skills if the employers are motivated by compliance rather than strategic development of their workforce skills (see also Hampson, 2004).

In relation to the delivery of VET, countries characterized as relying primarily on market-based models such as the UK and Australia (as well as New Zealand and South Africa) have moved much further along a competency-based pathway of structuring qualifications (Wheelahan, 2015). The move was made in part to accommodate employer requests for the training system to focus on immediate workplace requirements. By atomizing the body of skills and knowledge that make up an occupation, employers only need to pay for those units that they require at any one point in time. However, it has led to a more fragmented delivery of skills, and stripped away foundational knowledge (Wheelahan & Moodie, 2011), leaving graduates ill-equipped to acquire new skills in the workplace.

Wheelahan (2015), drawing on the VoC approach, argues that Australia's increasing adoption of LME characteristics in VET—limited social partner involvement, and market provision of training—has led to a number of deficiencies in Australian VET qualifications. They are fragmented, have poor status in the labor market, and provide a poor platform for advancement to higher level occupations. Arguably, it has also reduced the returns that workers in these countries receive from completing vocational qualifications, which are often quite low (and, in some cases, are negative) (Cooney & Long, 2010; Oliver, 2014). In Germany, returns for vocational qualifications are higher (on a year-for-year basis) than those for higher education qualifications (Bosch, 2010, p. 155).

Prevailing public funding models have also recently had a much more dramatic impact on how VET is delivered and financed in Australia. The displacement of dominant public provision of VET by a government-funded competitive training market has been an aspiration of Australian governments for nearly 20 years, with proponents believing it would lead to a more efficient, more responsive, and more innovative system, as well as break down some of the barriers that existed between states (Cooney & Long, 2010). Since 2012, a particularly radical system has been unveiled state by state, where block funding to public colleges of Technical and Further Education has been replaced by individual vouchers issued to students. The result has been the entry into the training provision market of thousands of new training providers, motivated more by accessing safe government revenue

streams rather than building up the country's skill base in challenging areas. Subsequently, there have been widespread complaints about quality of training (leading to some graduates having their qualifications withdrawn) and the extraction of super profits from government subsidies (Yu & Oliver, 2015).

When considering how VET is financed, the recent political-economic literature highlights that the issue is not one of choosing between markets or state-based arrangements. Rather, in the Anglo world at least, the key development has been the emergence of state-financed markets. And where such markets are not supported by either strong educational standards or credible communities of trust acting as custodians of credential quality, opportunistic market behavior can undermine achieving the most basic of skill objectives.

Critical Issue III: VET, the Labor Market, Industrial Relations, and Immigration

All institutional approaches stress the connections between VET, the labor market, and industrial relations. The structure of VET in different countries is intricately linked to the labor markets in which they operate. Maurice, Sellier, and Silvestre (1986) found that the same firm would recruit VET-trained workers to fill supervisory roles in Germany but university-trained workers to fill substantially the same role in France. Finegold and Wagner (1998) would report similar differences between German and British firms. Occupational labor markets in Germany are sustaining, despite pressures including globalization and changing corporate structures; this is attributable to the successful recent efforts to review and revitalize occupational standards (Bosch & Charest, 2010). In Australia, linkages of a similar nature persist where traditional apprenticeships remain strong, such as the electrical trades (whether because of occupational licensing or the strategy of strong unions) or because of compliance requirements, as occurs in early childhood education and care, construction, food handling, and security (Cooney & Long, 2010; Oliver & Walpole, 2015). Bargaining structures also affect the provision of in-firm training and CVET. The decentralization of industrial relations in Australia during the early 1990s (when determination of wages and other employment conditions shifted from the national and industry levels to the enterprise level) contributed to the collapse of corporatist arrangements overseeing VET, largely because employer associations were no longer required to play a coordinating role and individual firms (led by some large prominent examples) were free to pursue their own approaches based on strategic human resource management (Hampson, 2004).

Many of the interrelationships between VET and industrial relations have already been discussed. One dated US study found that increases in the minimum wage were associated with adverse effects on youth training (Hashimoto, 1982). The reverse is also true. In Australia in the 1990s, incentives for employers to take on trainees (who undertook nationally recognized on-the-job training for 1 to 2 years for a subminimum wage) were increased; this was argued to have helped reduce unemployment, even if there was little evidence that the traineeship scheme was delivering valuable skills for employers or viable long-term career paths for young people (Cully & Curtain, 2001).

Maintaining close linkages requires the training systems and the labor market to be organized by the same partners along the same occupational lines (Bosch & Charest, 2010, p. 18). Low entry-level wages supporting strong training in highly transferable skills and (relatively) standardized pay rates across firms within the same industry in Germany or Denmark facilitate the recognition of VET qualifications and keep a VET qualification attractive to young people and their parents (Bosch & Charest, 2010, p. 18). The same is not true of those countries with more market-based models, where a university qualification carries a much greater status.

Connections between VET and immigration have received much less attention in the institutional literature (see Chapter 8). Immigration of skilled labor and training of domestic workers are often perceived (especially in the media) as substitutes: Expanding employers' access to skilled migration reduces their incentive to contribute to training local workers, with the objective being a reduction in the prevailing wage and labor market conditions. However, Oliver and Wright (2016) present a more nuanced analysis. Using Australia as their example, they point to extended periods of high-skilled immigration and expansion in domestic training and further education.

New Directions: Capabilities, Vocational Streams, and Adaptive Capacity

In recent decades, there has been increasing questioning of the core assumptions underpinning mainstream economic reasoning and policy objectives. Especially close scrutiny has been given to the common welfare objective of both HCT and much institutionalist literature: preoccupation with the material dimension of life and especially with the objective of defining success in terms of "growth" in personal and national income. One response has been to draw on the "capabilities" approach developed by Sen (1983, 1999) in the context of general education and human development and to recontextualize it to VET. For example, individuals need to have the language, literacy, and mathematical skills for engaging and progressing in study and work. They need to have access to the social and economic resources that facilitate their participation in study and work, such as the necessary housing, healthcare, transport, and childcare, as well as enable their participation in civic society and in their communities. And they need to have the knowledge, skills, and attributes required to navigate, negotiate, and engage in these aspects of life more broadly, and to be skillful in their careers more specifically. In the VET context, capabilities link individuals, education, and work by identifying the individual, social, economic, and cultural resources and arrangements that individuals need to develop as autonomous and innovative workers within a broad set of related occupations.

Researchers working in the capabilities approach tradition have cogently identified that the problem of assuming economic growth is the self-evident paramount goal of economic and social life. As they put it: What is the utility of growth if large segments of the population do not flourish? Bryson notes that the capabilities approach "puts people at the centre of analysis," as it is about people's

for achieving well being

| Means to achieve | | Freedom to achieve | | Achievement |

| Core categories of the capabilities approach | Goods, services + resources (with certain characteristics) | Conversion factors - personal - social - environmental | Capabilities = opportunity set of potential functioning | Choice / Agency | Achieved functioning |

| Application of these categories to domain of skills + working life | Recognised skill (eg qualifications) | - personal : age, gender, ability confidence - social : public policy, social norms, laws - environmental : regional infrastructure : institutions : organisational practices | - to have a choice of job opportunities - to have access to quality ed/ training providers - to use and develop skills - to receive fair reward - to enjoy respect at work + in society etc | | - a vocation - a rounded life and lifestyle [- a career] |

Figure 7.1 A schematic representation of the capabilities approach: core categories and an application concerning skills and working life (Bryson, 2015). *Sources:* Bryson (2015, pp. 557, 560), Robeyns (2000, p. 5; 2005, p. 98), and Crocker and Robeyns (2010, p. 62).

"ability to lead lives [they] value and have reason to value" (Bryson, 2015, p. 556). A summary of the key elements of this approach is provided in Figure 7.1.

Figure 7.1 highlights that the ultimate concern of the capabilities approach is individual "functioning." Examples include "being literate, being healthy, being part of a community, being respected, working, resting, playing" (Bryson, 2015, p. 556). For all individuals to achieve this level of functioning requires more than rising levels of income at the individual and national levels. Instead of privileging "growth" as traditionally defined, researchers in this school are more concerned with people's freedom to achieve high functioning. Capabilities are defined as the "opportunity set of potential functioning" (Bryson, 2015, p. 557). Bryson, applying this framework to questions of working life and skills, argues these opportunity sets refer to individuals' choices concerning jobs, access to quality training providers, how skills are developed and used, and receiving fair reward for work and enjoying respect at work and in society. Freedom to achieve functioning itself has preconditions, namely, "the means to achieve" it, defined by Crocker and Robeyns (2010) as "goods, services and resources" and factors that enable the "conversion" of these into effective capabilities (pp. 67–68). The former refers to things like quality credentials (e.g., the products of a respected qualification regime). *Conversion factors* refer to personal, social, and environmental assets, rights, and entitlements. It is within this context that "capabilities"

researchers have a distinct definition of agency: "a person's ability to pursue and realize goals she values and has reason to value" (Alkire & Deneulin, 2009, p. 22).

For researchers working in this tradition, a situation is deemed better where people achieve a high level of functioning supported by sound capabilities that enables them to exercise substantive agency in how they live their lives. In a situation of inferior functioning, the challenge is not just to increase income—rather, it is to increase capabilities available to people, thereby increasing their capacity to make their own choices (i.e., exercise greater agency).

From the perspective of VET, the capabilities approach to skills and work differs markedly from an HCT perspective (Sen, 1987), which is relatively narrow, conceiving the acquisition of skills and knowledge as a means of increasing production possibilities, and the income of the individual. Contrarily, the capabilities approach sees value in education and training because it allows the individual to better communicate and argue, choose in a more informed way, participate in society's conversations, and otherwise fulfill their rights and duties as citizens. These additional roles are difficult to price in the labor market, but they are valued within the capabilities framework. These productive capabilities are therefore important for not only promoting productivity and both individual and wider prosperity, but also supporting lives of greater value.

It is important to recognize that these productive capabilities are not the same as "generic skills" or "employability skills." In the context of skills formation and work, the *capabilities approach* refers to the resources—including the broad knowledge, skills, and attributes—and the arrangements of work that individuals need to be productive at work, to progress in their careers, and to participate in decision making about work (Wheelahan et al., 2015). The approach focuses on what people need to be able to do to make complex judgments at work now and in the future, rather than on workplace tasks and roles based on existing or past practice. Productive capabilities are not independent of work, but neither are they so embedded in a particular workplace that they are of marginal relevance to other workplaces (Moodie, Wheelahan, Fredman, & Bexley, 2015). They are differentiated from generic skills, employability skills, or graduate attributes because they are not "general" or "generic." Instead, productive capabilities are located in and concentrate on an intermediate specialized level (Corbel, Wheelahan, Forward, & Darwin, 2014). Take the example of "problem-solving skills." It is possible to consider and develop these at a high level of abstraction—but this is not terribly helpful. A technician on an oil rig charged with putting out a fire and a childcare worker handling a toddler having a tantrum in the playground are both "problem solving." But successful execution of these activities requires more than generic problem-solving skills. To be effective, each requires domain-specific knowledge. Both could be good "problem solvers," but a childcare worker is unlikely to be of much use in handling an emergency on an oil rig, and an oil rig technician is most likely of limited utility in handling the common but demanding problems that emerge every day in a childcare center. Essentially, the capabilities approach leads one to conclude that policies that seek to develop generic skills are flawed—because generic skills can only be usefully deployed in a specific context, and to do that successfully requires the learner to draw on knowledge and values that only exist within a specific occupational domain.

What does this mean for VET policy and practice? As noted in this chapter, capabilities at work are not, generally speaking, usefully defined in universal terms (e.g., *problem solving*). Wheelahan et al. (2015) argue that there is a need to work with a modern notion of vocation and vocational streams to address this challenge:

> A **vocation** is a domain of *practice* preformed by humans as economically productive beings. It encompasses the knowledge, skills, and attributes they are required to use at work. A vocation emerges from fields of practice that share commonalities in knowledge and skills.… **Vocational streams** refer to the *structure of occupations* and the way they are linked horizontally in related occupations at the same level and vertically in specialist or more senior occupations. They consist of linked occupations that share common practices, knowledge, skills, and attributes that allow individuals to specialise within a broad field of practice, or move laterally into related occupations. Qualifications that prepare people for the labour market using vocations and vocational streams prepare individuals for broad rather than narrow fields of practice. (p. 7)

A good example of a potential vocational stream is provided by the case of care work. Currently, in many English-speaking countries, this work is segmented into distinct, very specialized types of work: aged care, disability support, drugs and alcohol care, and so on. In thinking about increasing the range of potential jobs that a worker could take on and the realms in which an employer could redeploy them, there is value in developing underpinning capability in care work. This would provide a platform for specialization in the specific areas just noted. Effective vocational development therefore requires:

1) Identifying "capabilities in common" for the vocation of care
2) Enabling the partners of a community of trust associated with care work to identify how those capabilities should be developed and demonstrated.

Determining how vocational streams are defined, the content of the capabilities in common, and establishing communities of trust are clearly major empirical and political challenges. But questions of skill formation and use always are. The political economy of skills is not just a technical problem of prices and quantities of the kind commonly assumed in HCT. Tacit vocational streams of some kind—some coherent and exclusive (e.g., medicine), and some fragmented and barely coherent (such as customer service)—already exist. For the capabilities approach, the key challenge for the political economy of VET is to work out how best to deal with these complex realities and achieve something more effective than the current arrangements.

Conclusion

This chapter has provided an overview of the main political economy approaches applied to the study of VET. HCT has had a pervasive impact on VET research and VET policy over the last 50 years, and can be linked to the increasing

commodification of VET. Yet HCT leaves unresolved many of the key questions of VET, and its usefulness as an approach for understanding and resolving the many challenges in VET policy and practice must be challenged. A variety of institutionalist approaches focus much more on the nonmarket aspects of VET, providing a rich literature that outlines why VET systems differ from country to country, how VET evolves over time, and how VET interrelates with other socio-economic systems, including product markets and the labor market. These approaches may not offer the same illusion of precision as HCT, but they provide a much more vibrant understanding of the fundamental role played by labor demand and employer behavior in shaping how VET is structured, financed, and delivered. The emerging capabilities literature provides a framework for reconsidering one of the fundamental questions surrounding VET, namely, its purpose. In particular, the capabilities approach provides novel leads into how an economy's and individuals' functioning can be improved simultaneously. Critical to this is VET providing structures of support that give individuals substantive choices in how they can live lives they value. As such, the capabilities approach brings us back to where the political economy of VET began—as an essential part of moral and political philosophy.

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8

The Politics of Vocational Training: Theories, Typologies, and Public Policies

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Introduction

Recent scholarship on skills and vocational training systems from the perspective of comparative political economy has highlighted the role of skills for economic performance and social equality (Busemeyer, 2015; Solga, 2014) and identified multiple institutional complementarities between skill formation systems and labor market and welfare state institutions (Estévez-Abe, Iversen, & Soskice, 2001; Hall & Soskice, 2001; Iversen & Stephens, 2008). In some of these accounts, political conflicts about the institutional design of education and training systems are identified as a crucial force driving processes of institutional and policy change. Consequently, studying the politics of vocational training is or should be a central concern not only for political scientists but also for education scholars, economists, and other social science researchers.

In the analysis of the politics of skills, it is useful to distinguish, on the one hand, between the actors whose preferences and interests shape political conflicts about the design of education and training institutions; and, on the other hand, between the arenas where these conflicts of interests are settled and processes of decision making take place. There are three main actors who are involved in the politics of vocational training: (a) firms and employers as well as their associations who represent the labor market demand side in skill formation; (b) the actors on the supply side of skills (i.e., labor interests and trade unions); and (c) the state, which may intervene in the provision and financing of skills by public policies. There are, therefore, two main arenas in which the politics of vocational training and skill formation takes place. The first arena is the economic sphere of the labor market and refers to training activities of firms and workers, related collective action problems that employers and unions are facing, as well as actors' decisions on skill investments and how they not only are influenced by but also affect cooperation and bargaining in labor relations. The second arena is

the political-administrative arena, where the politics of vocational training pertains to political decision-making processes in vocational training, employment, and social policies, which in turn are affected by party politics, state traditions, and institutional legacies.

This chapter summarizes the major concepts and findings of the comparative political economy literature on the politics of vocational training based on this loose framework of actors and arenas. In the context of this chapter, we focus on initial vocational education and training (VET) mostly and the way VET policies and institutions are embedded in national skill formation and welfare state regimes. This is, of course, only one particular aspect of the overall picture, but this focus is in line with the existing literature in comparative political economy. The next two sections of this chapter discuss the economic sphere and thus the politics of skill formation in the labor market arena. Then, the "Typologies of Skill Formation Systems" and "Public Policies and Skill Formation" sections map how the politics on vocational training play out in the political arena. In greater detail, the "Political Economic Theories of Skills" section reviews the political economic literature on firms' and workers' decisions on training. Although there are of course other important contemporary challenges facing policymakers, such as demographic change, digitalization, and academization, the "Skills and Labor Migration" section maps the major findings on how labor migration affects skill formation. Focusing on the political arena, the "Typologies of Skill Formation Systems" section discusses how different types of skill formation systems have developed, and the "Public Policies and Skill Formation" section discusses political decision-making processes in vocational training policies and how they are affected by party politics, policy legacies, and other institutions of the welfare state regime.

Political Economic Theories of Skills

Reviewing the economic literature on skills (Becker, 1993; Williamson, 1981) and the social science literature on trade unions, institutional labor economics, and industrial sociology (henceforth, *classical literature*), in the analysis of the politics of skills in the economic arena, two major perspectives can be differentiated. Whereas the economic literature on skills views the acquisition of skills and their use through the lens of efficiency theory and thus as a rational choice decision of individual employers and workers, the social science literature emphasizes the sociopolitical dimensions of skill formation. Skill formation interacts with the dynamic of labor relations as well as production regimes because the means of how skills are acquired have power-distributional consequences and reflect power relations. This is because the demand and supply of human capital impacts the basic power resource of labor (Korpi, 1983), not only at the workplace level and within firms, but also at the sectoral and national levels. Social science also makes clear that economic decision making on skill investments relies very much on collective resources such as institutional support provided by collective-bargaining institutions, public policies, or networks because economic decisions are inherently decisions taken under uncertainty (Crouch, 2005). Thus, the economic and social science literature on skills and skill formation is linked to different causal concepts of skills and of economic action as well.

In the center of the economic literature on skills and skill formation are efficiency-theoretical accounts, which take individual preferences of firms and employees as the starting point of any analysis. The formation of skills is modeled as an individual decision based on the principle of rational choice of employers and employees to invest or not to invest in human capital (Becker, 1964) or "human assets" (Williamson, 1981). Individual cost–benefit calculations in terms of higher profits (lower costs) and higher wages determine whether and in which skills firms and labor invest. However, as with other economic decisions, the choice in skill investments is susceptible to situations that make investment inefficient and skill investments irrational. Such difficult situations comprise, for example, the collective good problem (when trained workforce may move horizontally across firms: instead of the poaching problem), the problem of metering (assessing workers' productivity), and, finally, the problem of transaction costs.

Becker (1993) has shown that employers have only incentives to invest in those "specific" skills that increase the firms' own productivity, whereas they refrain from investments in "general" skills, which are portable, because they also increase the productivity in other firms. In Williamson's (1981) transaction cost theory, asset specificity is an "important dimension to describe transactions" (p. 555). Accordingly, he views "human assets" as specific (co-specific due to the bilateral exchange relation) if skills "are deepened and specialized to a particular employer," so that both the employer and the employee are interested in "maintaining a continuing employment relation" (Williamson, 1981, p. 563). Neither the employer nor the employee can terminate the relationship without "loss of productive value" (Williamson, 1981, p. 563). While specific skills (human assets) are linked to high transaction costs, general skills are unspecific assets that are connected to low transaction costs because these human assets can be used for various purposes and are valuable to a large number of users.

Williamson (1981, pp. 563–565) also claims that besides asset specificity, the uncertainty of measuring productivity as well as the nature of skills (in the sense of skill levels) are also decisive factors for whether a human asset governance problem arises or not. Williamson (1981, p. 567) makes clear that bargaining institutions and unions may solve these governance problems of investments in specific skills, as he argues that a higher degree of human asset specificity makes it more likely that trade unions develop (see also Chapter 9, this volume). The Varieties of Capitalism (VoC) literature largely follows this efficiency-theoretical perspective and contends that specific skills are only provided and trained when investments are "protected" by wage compression, employment protection, or social insurance, whereas firms' investments in lower degrees of skill specificity, thus general skills, are much less problematic (Iversen & Soskice, 2015). However, VoC scholars neglect that neither Becker nor Williamson theorizes that skill specificity has to be equalized with the level of skills, which they both treat as an additional dimension.

Despite the conceptual differences between Becker and Williamson, it becomes clear that economic accounts of skills explore skill formation as well as labor relations in terms of efficiency. Processes and structures of labor relations are at best viewed as consequences of skills but not as main determinants of systems of skills formation ("structure follows function" rather than "function follows structure"). Thus, the economic perspective on skills discusses links between skills

and collective bargaining, but it does this in a unidirectional and simplified way by arguing that structures and processes of labor relations are efficiency-enhancing solutions for skill investments.

In contrast to the economic literature, the classical literature (in political science and industrial sociology) emphasizes reciprocal causation and the non-functional aspects of skill formation. It therefore differs from the efficiency-theoretical framework, which argues that skills and skill formation are mainly driven by individual cost–benefit calculations. Criticizing the efficiency-theoretical perspective as ahistorical, the classical literature views skill formation from a broader perspective, or—as Maurice, Sellier, and Silvestre (1986) put it—in a "societal" framework. This "societal" framework was mainly developed inductively, based on empirical cross-country research on training systems. It claims that the formation and development of training systems interact with their institutional underpinnings, which are created and maintained by the state as well as the formal and informal nonmarket institutions, which govern labor relations. In a lot of studies, these differences in institutional foundations are illustrated by comparisons of the British and German cases, which are often described as low- versus high-skill equilibria (i.e., the failure and success of getting firms to train) (Crouch, 2005; Finegold & Soskice, 1988; Gospel, 1994; Marsden, 1999).

The classical literature on trade unions, institutional labor economics, and industrial sociology posits that skills are socially constructed and that patterns of skill formation are related to prevailing power resources, processes of industrialization, and democratization, and therefore also linked to patterns of social stratification (Streeck, 2005, p. 264). In this literature, skills are viewed as "collective, social production factors which capitalist firms, acting according to the rational-utilitarian model, cannot adequately generate and preserve" (Streeck, 1989, p. 94). In the domain of industrial sociology, the works of Kern and Schumann (1984) and Maurice et al. (1986) nicely illustrate how the formation and development of skills interact with labor relations—not only because of the power-distributional implications of skill systems but also due to organizational and social stratification processes. Drawing on sociological theory or institutional labor market theory, for example, Streeck (2005, p. 260) argues that labor markets have structures and that their central institution is the employment contract (which is by itself the result and outcome of a power struggle and the exploitation [or sale] of labor). The commodification of labor led to the formation of trade unions, which also sought to control the supply of labor by controlling the formation of skills and the allocation of skilled workers. Thus, by shaping skill formation as well as wage bargaining (institutions), union power affects the supply of labor (Streeck, 2005, pp. 263–264).

Prior to industrial sociological commentaries, Anglo-American labor economics, which criticized neoclassical wage theory (Kerr, 1954, pp. 107–108), had developed a very similar perspective. In contrast to neoclassical and efficiency-theoretical accounts, in his writing on the *Balkanization of labor markets,* Kerr (1954) maintained that the supply of and demand for skills are not "independent variables which simultaneously determine the wage and the volume of employment," but that demand and supply of skills as well as wages "all respond to more

or less control by the bargaining institutions" (i.e., unions and employers) (p. 107). In Kerr's (1954) concept of occupational (craft) versus internal labor markets, craft markets, for which craft unions set "ports of entry" (Kerr, 1954), are organized as well as protected by occupational skills, which are portable across firms as "the craft worker moves horizontally in the craft area" (p. 104). In contrast, in internal markets, which are shaped by workplace-specific skills and are central for industrial enterprises, "[t]he plant or company or industry is the market" (Kerr, 1954, p. 99). Industrial unions cannot control the supply of labor, and their strategies are more targeted to the demand of labor "by introducing guaranteed wage or heavy dismissal bonuses" (Kerr, 1954, pp. 107–108). In sociology, these patterns of organization of trade union types around skills types have been intensively studied by Streeck (1989, 2005, 2012). Streeck makes clear that there are crucial differences between craft unions (which organize skilled workers with transportable, union-controlled skills), industrial unions (which organize all skills, partly workplace-specific but also broad, and where control over skills is contested), enterprise unions (all skills, workplace-specific skills, and employer controlled), and general unions (unskilled workers). These different structures cannot be explained by skill investments, which workers and firms make without being affected by contextual institutional conditions; rather, there are sequences and patterns of democratization and industrialization (Streeck, 2005), which "led to nationally specific institutional constraints and opportunities for capital and labor" (Streeck, 2012, p. 343) with regard to how work, production, and labor relations are organized.

The German training system can be viewed as a prototypical example for illustrating these reciprocal interdependencies between wage bargaining and training and how these interdependencies structure labor markets. From the sociopolitical perspective, Streeck (1992) explains the relationship between wage bargaining and training and its importance for *diversified quality production* as follows: "[H]igh and even wage level makes employers more willing to invest in training and retraining as a way of matching workers' productivity to the externally fixed, high costs of labor" (p. 52). However, besides such institutional collective resources, labor shortages or surpluses also affect decisions of employers and young people to invest in vocational training. In times of labor shortage, low-wage compression may decrease incentives for employers and employees to invest in training (Ulman, 1968, p. 372).

Likewise, Streeck (1989) argues that because vocational training requires young individuals to "accept the long deferral of gratifications that is the essence of investing" for them, training "presupposes a degree of certainty as to what one is likely to need and value in the future" (p. 92). This certainty is provided by social institutions such as the German *Beruf,* as well as collective industrial relations, which may both provide just those collective resources that make utilitarian behavior in markets possible (Streeck, 1989, p. 89). Thus, the sociopolitical perspective also argues that "skill acquisition and identity formation" are closely linked and that skill investments are not just "motivated in terms of rational investment in the longer-term pursuit of individual interests" (Streeck, 1989, p. 92); rather, collective institutions that reduce uncertainty facilitate firms' and worker's commitment to skill acquisition. Streeck (1989, pp. 96–97) highlights that such collective resources are a necessary and sufficient condition for employers'

investments in skills when firms need broad, unspecific skills, thus "skills as a *generalized, polyvalent resource* that can be put to many different and, most importantly, *as yet unknown* future uses" (Streeck, 1989, p. 97). The sociopolitical concept of skills makes clear that labor relations not only depend on skills but also affect skill formation. Sorge and Streeck (1989) argue, for instance, that the "interaction between organization, skilling, and industrial relations … is not deterministic but rather … the result of reciprocal causation and interacting strategic choice" (p. 27).

There are, of course, other aspects that are of crucial importance in any analysis of the relationship between skills and labor relations. One further major point of discussion is that skills and skill formation can be incorporated in bargaining processes between unions and employers, because skill formation addresses questions of a collective nature (such as apprentices' wages, job classifications, skill-based salary classifications, standardization, portability, accreditation, or funding). These issues are important for collective bargaining not only at the firm level, but also at the sectoral and national levels (Heyes, 1993; Heyes & Rainbird, 2011; Mathews, 1993; Trampusch & Eichenberger, 2012). As Stuart and Huzzard (2015) highlight, post-Fordist-period unions in particular have become more active in incorporating training issues into bargaining rounds to promote their empowerment. There is some but not a lot of research on this topic, neither on the substantive content of such agreements nor on factors explaining them (e.g., on initial vocational training: Stuart, 1996; Trampusch et al., 2010; and on continuing vocational training: Acemoglu & Pischke, 1999; Cognard, 2015; Di Maio & Trampusch, 2018; Trampusch & Eichenberger, 2012; Trampusch et al., 2010).

Both the economic and classical strands of literature differentiate between different types of skills, but not in the same manner. Most importantly, the term *skill specificity* is differently defined, leading to different meanings of general and specific skills (Busemeyer, 2009a; Streeck, 2012). By the 1950s, labor economics, human resource management, institutional economics, as well as research on labor relations and production systems pointed to strong intersections between labor relations and skills (Streeck, 2012, p. 318). Institutional labor market economics and industrial sociology highlight that unions as well as structures and processes of industrial relations intervene in the formation of skills (Streeck, 2005, p. 264). As Stuart and Huzzard (2015) put it, "[T]he definition of skills has also been an historical concern of unions—an ongoing point of contention with employers—with such definitions shaping both the identity and contours of solidarity of unions, along either occupational, industry, or enterprise lines" (p. 1). They point to the British craft unions as a historical example of how unions have used skill formation (in this case, the apprenticeship system) as an instrument to control the trade and to set barriers to unskilled workers who endanger the status of skilled workers (Stuart & Huzzard, 2015, p. 2).

A good test case for illustrating how the politics of skills play out in the economic and labor market arena is the analysis of how labor migration affects skill formation and training systems. The "Skills and Labor Migration" section elaborates on how labor migration may cause collective action problems among employers and unions, which may challenge vocational training systems not just in receiving countries but in sending countries as well. Of course, labor migration

also spills over into the political arena, as the recent revival of populist parties in the wake of the current labor and refugee migration process reveals and the Brexit vote in the UK has bluntly demonstrated. How this rise of (non)populist and antimigrant movements may also impact training policies will be further discussed in the "Conclusion" section.

Skills and Labor Migration

In economic terms, *labor migration* means the movement of "labor power and embodied human capital" (Freeman & Kessler, 2008, p. 659). Because labor market and collective-bargaining institutions determine the availability of skills and alternative means of generating the skills employers require, these institutions also significantly affect how labor migration alters training systems. Moreover, immigration can be a functional equivalent not only for increasing wages in those sectors in which labor supply is scarce (Anderson & Ruhs, 2010, pp. 34–26) or for industrial relocations of plants to foreign countries where labor is abundant and cheap; rather, migrant workers may also be a substitute for building up a vocational training and apprenticeship system that ensures a sufficient number of skilled workers. However, alternatively, unions and also employers may resist migration in order to protect their own wage and training regime. A recent study on the Swiss construction sector has even revealed that employers and unions even do both: They support the hiring of skilled foreign workers, and at the same time protect the occupational labor market for natives and, therewith, the apprenticeship system in this sector (Trampusch, 2018). For these reasons, analysis of the relationship between migration and skill formation is of major importance in understanding how labor relations and conflicts fought in the labor market arena affect the institutional design of VET. Migration also challenges the conventional view to analyze the evolution and change of skill formation systems from a national perspective only (Afonso & Devitt, 2016, p. 7), assuming closed labor markets. The more labor and service provision crosses national borders, the more traditional "methodological nationalism" in the literature on training systems seems to be an inappropriate perspective.

In the European Union (EU), the free movement of labor and services, but also the right of establishment for citizens of EU member states to work or pursue activities as self-employed persons, are the main drivers of within-EU labor migration (Eichhorst, 2000, Dølvik & Eldring, 2008, p. 18; Hardy, Eldring, & Schulten, 2012). *Labor mobility* can refer to different forms of mobility, such as permanent or temporary, seasonal, or cross-border mobility (Galgóczi, Leschke, & Watt, 2012). It also relates to unskilled and low-skilled workers as well as high-skilled workers. In particular, the enlargement from EU-15 to EU-28 has massively fostered labor migration (Constant & Zimmermann, 2013; Kahanec & Zimmermann, 2010). As migration affects the supply and demand side of skills in the sending as well as receiving countries, any political economic account of skills and training has to consider potential relationships between labor migration and skill formation. Nevertheless, and surprisingly, this is remarkably underresearched (Dølvik, 2016; Dølvik & Eldring, 2008; Korpi, 2012).

Previous labor market research has mainly analyzed the economic, cultural, educational, and social assimilation of migrants as well as how immigration

affects the welfare and income of natives (Constant & Zimmermann, 2013) and how gaps between natives and immigrants in socioeconomic terms (e.g., wages and labor standards) can be explained (Kahanec & Zimmermann, 2010). Comparative politics often discusses these effects of immigration on labor markets under the heading "the politics of cheap labor" (King & Rueda, 2008) or investigates how political economic institutions affect employers', unions', or state authorities' preferences on the number and skill profiles of labor immigrants and, consequently, also condition coalition building between employers, unions, and governments in immigration policies (Caviedes, 2010; Cerna, 2009; Menz, 2008). Studies on how labor migration affects systems of labor relations as well as power relationships between unions and employers (Afonso, 2012; Cremers, Dølvik, & Bosch, 2007; Freeman & Kessler, 2008; Penninx & Roosblad, 2000; Pulignano, Meardi, & Doerflinger, 2015; Refslund, 2016) are also relatively widespread. However, the literature on processes such as brain drain and brain gain and how they may affect human capital and training systems in home and host countries is much more moderately developed (see Dølvik, 2016; Dølvik & Eldring, 2008; Galgóczi et al., 2012). There are some studies on how immigration affects natives' educational attainments and educational choices (on which, see Røed & Schøne, 2012) and how it affects employers' investments in training (Card, 1997; Røed & Schøne, 2012); but research on how migration may alter the politics and institutions of skill formation is rare.

The links between labor migration and skill formation can be manifold, and from a political economic perspective it seems reasonable to distinguish between different levels in the study of effects of migration on vocational training, namely, the country, sectoral, regional, and firm levels, and the levels of individual employees. Moreover, it is important to scrutinize how migration alters collective action in the employers' and unions' camp, and how it transforms collective and individual actors' skill preferences on the demand and supply sides of labor (Anderson & Ruhs, 2010; Dølvik et al., 2015). Migration may generate effects, as it affects the willingness of firms and employees to invest in vocational training in receiving as well as sending countries. Bluntly, Anderson and Ruhs (2010) argue that "immigration may not only be a solution to employers' reluctance to invest in training their workforce in very specific skills, but also a more general response to a breakdown between the system of production and employment on the one hand and education and training on the other" (p. 37). The most obvious consequence of migration is that it may undermine national, sectoral, or regional training systems of host countries and sending countries.

The latter effect may occur because high wages for unskilled work abroad may decrease employers' and workers' incentives to offer or enter an apprenticeship at home. Prominent recent examples for effects in home countries are the Polish construction and care sectors (Dølvik & Eldring, 2008; Polakowski & Szelewa, 2016) and the postcrisis brain drain in the Southern Euro Zone (Cenci, 2015). There is much evidence that the increased labor mobility within the EU is accompanied by such undermining effects for training systems also in host countries (such as the Nordic countries, Germany, and the UK), with sectors such as construction, hospitality, and care being affected the most (Anderson & Ruhs, 2010, pp. 36–37; Dølvik & Eldring, 2008; Røed & Schøne, 2012). In the past and today,

firms have intentionally supported the immigration of skilled labor instead of creating these skills domestically. For the UK, research shows that sectors such as construction, IT, hospitality, and care are particularly concerned (Bach, 2010; Caviedes, 2010; Chan, Clark, & Dainty, 2010; Lucas & Mansfield, 2010). In these sectors, the lack of training provision has produced skill shortages, which are compensated by immigration. In Norway, migration from Eastern and Central Europe has also led to a decline in apprentice contracts in the ship-building industry by the use of service providers (Dølvik & Eldring, 2008). The British care sector, where cheap migrant workers are employed, is a prime example of how skill-based immigration is also used to keep wages (and therewith health costs) low (Anderson & Ruhs, 2010, p. 44). Such undermining effects also occur in the USA and Australia (Thelen, 2004; Toner, 2008; Toner & Woolley, 2008; Wright, 2012). Toner and Woolley (2008) claim, "There are only two ways for a nation to secure an adequate supply of skilled workers: domestic skill formation and immigration" (p. 47). Wright (2012) argues that "Australia has relied on immigration as a critical source of labour and skills ever since colonisation" (p. 113). In general, it is argued that particular liberal market economies (LMEs), which lack regulated labor markets and standardized and certificated training systems, solve skill shortage problems by skill-based liberal immigration policies, whereas coordinated market economies (CMEs) have lower levels of immigration than LMEs (Guzi, Kahanec, & Kureková, 2014, p. 27). It is hypothesized, therefore, that the stronger VET systems are institutionalized and regulated (at the national, sectoral, or regional level) and the more employers are committed to vocational training, the lesser shifts training systems may experience (Dølvik et al., 2015). However, to the best of our knowledge, this stark empirical expectation has not yet been systematically empirically tested.

To understand and explain such systemic effects of immigration on training institutions at the country, sectoral, or regional level, one needs to scrutinize employers' and unions' preferences on skill profiles of migrant workers and how immigration may generate collective action problems (Dølvik et al., 2015). In comparative political economy, dual labor market theory was one of the first approaches to do this, but this theory focuses on the secondary market and, thus, the segment of unskilled workers. Piore's (1979) dual labor market theory claims that migrant workers are in the secondary sector, where wages and labor standards are low, whereas the natives are in the primary sector, which is protected and reserved for well-paid and high-skilled work. In a recent study, Wagner and Hassel (2016) apply the dual labor market theory to the German meat industry and show that in this sector, a primary sector for natives with protected standard employment coexists with a secondary segment in which cheap migrant workers are employed by subcontractors.

With regard to the demand side, labor and skill shortages, the production strategy, as well as the skill intensity of production matter for employers' preferred profile of immigrant skills (Afonso, 2012; Caviedes, 2010; Cerna, 2014; Johansen, 2002; Menz, 2008; Peters, 2014; Wright, 2012; for a literature review, see Afonso & Devitt, 2016). One prominent finding is that firms in LMEs are more in favor of migrant labor with low as well as high skills, whereas those in CMEs support high-skill labor migration. Moreover, Peters (2014) has shown

that the degree of trade openness is of importance because firms in closed trades welcome low-skill migration, whereas those in open trades can more easily relocate their production, which lowers their need to have skilled labor at home. Caviedes (2010) argues that a further factor influencing employers' preferences for immigrants' skill profiles is their flexibility needs, which differ across economic sectors. He shows that firms use migrant labor to improve their numerical flexibility, temporal flexibility, and wage flexibility (Caviedes, 2010, p. 11).

It is of particular importance to note that, for unions, migrant labor generate a dilemma (Penninx & Roosblad, 2000), as they have to decide whether to cooperate with employers or oppose migrant workers policies, and whether they should protect their members from foreign competitors or include foreign workers in their organization as well as in their wage and labor policies (see also Hardy et al., 2012; Piore, 1979). Because of wage income as well as fiscal effects of migrant workers, Freeman and Kessler (2008, p. 670) highlight that there is a "robust skills cleavage over immigration policy" among workers, as highly skilled workers are more liberal than low-skilled workers. Thus, "trade unions have tolerated immigration that is complementary to national labor, and, opposed immigration that substitutes for it" (Freeman & Kessler, 2008, p. 671). Low-skill workers are more in favor of high-skilled migrants, whereas high-skill natives prefer low-skill migration (Cerna, 2014, p. 71). Various studies have also demonstrated that unions' preferences on and strategies toward migrant workers are strongly affected by industrial relations institutions, unions' power resources, as well as their organization structure (e.g., craft vs. industrial unions) (see Cerna, 2014; Hardy et al., 2012).

Typologies of Skill Formation Systems

Typologies play a useful role in social science research, because they help to make sense of variations of phenomena such as educational institutions across a large set of cases. This is done by defining underlying and often latent analytical dimensions, which serve to construct ideal-type models, which in turn can be used as measuring rods to classify real-world cases. In the literature on skill formation systems, we find different attempts of devising typologies, which we will review briefly here. These typologies—to the extent that they are based on a theory rather than simply describing empirical variation—draw from both perspectives mentioned in this chapter and can be combined in fruitful ways (Busemeyer, 2015; Iversen & Stephens, 2008).

As argued here, skill formation regimes are located at the intersection between the political and the economic arenas, as well as between the welfare state, the education system, and labor market institutions. As a consequence of this, the first generation of studies devising typologies of skill formation systems (Blossfeld, 1992; Crouch, Finegold, & Sako, 1999; Finegold & Soskice, 1988; Greinert, 1998; Lynch, 1994; Ryan, 2000) identified different analytical focal points, which refer to different actors and/or arenas in the system. For instance, Lynch (1994) argues that the dominant venue of where training takes place should be the decisive criterion used to classify systems (e.g., schools, as in France or Sweden; or workplaces, as in Germany and Denmark). In a similar

vein, Greinert (1998, pp. 22–28) distinguishes systems according to the role of the state in the process of skill formation. He identified a group of liberal systems such as the UK and USA, in which the role of the state is rather diminished. In contrast, the state dominates in the bureaucratic (school) model (e.g., in France, Italy, or Sweden), whereas the responsibility for training is shared between state and nonstate actors in the corporatist dual apprenticeship model. These three types of skill formation systems are similar to the ones identified in Crouch et al. (1999) as well as Anderson and Hassel (2013). Blossfeld (1992) further adds the dimensions of standardization and certification of vocational skills as well as the stratification of the vocational training system.

More recent work in this tradition expands existing typologies of skill formation to countries beyond the Organisation for Economic Co-operation and Development (OECD) world, which often implies devising a more complex set of indicators as the diversity of systems increases. Eichhorst, Rodríguez-Planas, Schmidl, and Zimmermann (2012), for instance, pay more attention to informal training, which is a consequence of the fact that VET in developing and transition countries often takes places in the informal parts of the economy. Pilz (2016) devises a typology that adds other institutional dimensions such as stratification and standardization as well as actual practices of learning at the micro level of firms. This more fine-grained typology can then be used to classify a diverse set of cases from the USA via Germany to India and China.

These examples of skill formation typologies are largely rooted in comparative education research. In contrast, scholarship in the tradition of the VoC literature strongly emphasizes the existence of institutional complementarities between skill formation, labor market relations, corporate governance, and social policies (Busemeyer, 2009a, 2015; Crouch et al., 1999; Estévez-Abe et al., 2001; Finegold & Soskice, 1988; Hall & Soskice, 2001; Streeck, 1989; Thelen, 2004). The commonality between these approaches is that coordination and collective action problems involving employers, unions, and the state are put in a central place. Systematic differences in how these coordination problems are addressed (or not) are related to differences in skill formation regimes and labor relations.

The earlier literature, starting from the seminal contribution of Finegold and Soskice (1988), draws a quite stark distinction between skill formation in LMEs such as the UK and the USA, on the one hand, and CMEs such as Germany or Sweden, on the other (Hall & Soskice, 2001). The reasoning behind this dichotomized distinction is the argument that because of feedback effects and institutional complementarities, skill formation systems (and countries in general) will move in the direction of either a full LME or a full CME (Hall & Gingerich, 2009). In this sense, the two poles of LMEs and CMEs represent institutional "equilibria." This core claim of the VoC school of thought has been criticized as overly functionalist (Becker, 2007; Crouch, 2009; Streeck, 2009).

The original VoC framework (Hall & Soskice, 2001) argues that different types of capitalism are related to and ultimately based on varieties in skill formation institutions, which influence the supply of different kinds of skills in the economy. In LMEs, the dominant mode of coordination between actors (firms) is market coordination. In this setting, firms have little incentive to invest in the skills of

their workers, because there is a high probability that competing firms might poach those workers with high skills (Acemoglu & Pischke, 1998, 1999). Because of the limited willingness of employers to invest in skill formation at the workplace, the workers-employees are essentially forced to invest in portable, academic skills ("general skills" in the parlance of Becker, 1964; Hall & Soskice, 2001).

In CMEs, the situation is different, because there are strong institutional constraints such as employment protection legislation or generous unemployment compensation schemes (Estévez-Abe et al., 2001), which from an economic perspective might be regarded as "imperfect labour markets" (Acemoglu & Pischke, 1999) or outright regulation as they delimit the autonomy of the firm to hire and fire. However, according to the sociopolitical perspective discussed here, these constraints may turn out to be "beneficial" (Streeck, 1989, 1992) from the perspective of skill formation, because delimiting the ability of employers to fire workers creates strong incentives for firms to invest in skill formation to make their employees as productive as possible. Furthermore, employers in CMEs can rely on nonmarket forms of coordination, in particular via politically and institutionally powerful employers' associations and chambers of industry and commerce. These organizations organize the exchange of information and other training-related activities such as examinations and the certification of skills. These institutional features of CMEs help to address the collective action problem in skill formation between employers as well as conflicts of interest between employers and unions, so that joint investments in vocational skills become feasible. Hence, CMEs are characterized by a strong supply of vocational, "specific" skills (Estévez-Abe et al., 2001).

The VoC framework is extremely helpful in highlighting systematic differences between different types of capitalism, based on a sophisticated theoretical framework. As a typology of skill formation systems, however, the VoC framework is rather blunt, because it primarily distinguishes between LMEs and CMEs. Hence, subsequent contributions to the literature have both criticized and refined this typology. Estévez-Abe et al. (2001, p. 154), for instance, identify different types of "specific" skills that are connected to different types of labor market regulation. In countries with a high degree of unemployment protection (e.g., high levels of benefit generosity, as in Denmark), industry-specific skills are more common, which are skills that can be used productively in a range of firms within a particular industry. Generous unemployment schemes enable skilled workers to look for adequate jobs requiring their particular skill set, which in turn encourages them to invest in occupational/vocational skills rather than pure general/academic skills. In contrast to industry-specific skills, *firm*-specific skills are even more specific, because they are tied to a particular firm context. In countries with a high degree of employment protection (e.g., high barriers against dismissals, as in Japan), firms have a strong incentive to invest in the skills of their workers, who are also more likely to stay with their training firm for long periods of time. Countries with both a high degree of employment and unemployment protection (such as Germany) would, according to Estévez-Abe et al. (2001), be characterized by skill formation institutions that provide a mix of industry- and firm-specific skills. Estévez-Abe et al. (2001) largely follow the efficiency-theoretical account discussed in this chapter by discussing how existing institutions shape skill formation strategies of employers, unions, and individuals rather than their political and historical origins.

This first extension of the original VoC framework hints at the fact that the variety of skill formation regimes, in particular within the large cluster of CMEs, is larger than initially proclaimed (see Anderson & Hassel, 2013; Busemeyer, 2009a; Busemeyer & Trampusch, 2012; Crouch et al., 1999; Culpepper & Thelen, 2008; Iversen & Stephens, 2008). Furthermore, as is argued by Busemeyer (2009a) and Streeck (2012), the distinction between general and specific skills in the original VoC framework is misleading, because it wrongly equates the content of skills with their portability, and it neglects the dimension of different *levels* of skills. On the former point, Busemeyer (2009a) argues that the competitive advantage of VET systems in countries with supposedly "specific" skills such as Germany, Japan, or Denmark is not that they produce highly specific skills, which would only be usable in a single firm. In contrast, because of a high level of employer investment in skill formation, vocational skills are polyvalent (Streeck, 1996) and in principle transferable from one firm to another. Hence, the competitive strength of these systems is that they produce an ample supply of "transferable" skills (Stevens, 1996), which are partly general and partly specific in terms of content. The real *portability* of these skills is, however, defined and circumscribed by labor market institutions such as employment protection, authoritative mechanisms of skill certification, and collective wage bargaining: For example, a worker at a Japanese car-manufacturing plant will probably have a skill set that could also be used productively in a competing firm, but because authoritative mechanisms of certifying vocational skills are weakly developed in this country and employers coordinate with each other to avoid poaching, the worker has limited leeway in actually transferring these skills.

Building on these arguments, Busemeyer and Trampusch (2012) propose a new typology of skill formation systems based on two underlying analytical dimensions: firm involvement in (initial) VET, on the one hand, and public commitment of the state toward the provision and financing of VET, on the other (see Table 8.1). The first dimension of firm involvement captures the degree to which employers contribute to investment in initial VET. As indicated in the previous paragraph, employer investment in skill formation should not be conflated with the provision of (firm-) specific skills—on the contrary. A higher degree of firm involvement in the provision and financing of VET implies that apprentices learn skills beyond the immediate short-term needs of the firm, *in spite* of the fact that

Table 8.1 The variety of skill formation systems in advanced industrial democracies.

Public commitment to vocational training	**High**	Statist skill formation system (SW, FR)	Collective skill formation system (GE, CH, AU)
	Low	Liberal skill formation system (US)	Segmentalist skill formation system (JAP)
		Low	**High**
		Involvement of firms in initial vocational training	

AU, Austria; CH, Switzerland; FR, France; GE, Germany; JAP, Japan; SW, Sweden; US, United States.
Source: Busemeyer and Trampusch (2012, p. 12).

this kind of investment is associated with a number of collective action problems. Vice versa, a low degree of firm involvement in initial VET signals that employers are reluctant to invest significantly in skill formation, which means that firms largely rely on graduates from general schooling and academic higher education who, if anything, receive some truly specific on-the-job training to meet short-term skill needs.

The second dimension refers to public commitment to the provision of VET, that is, the degree to which state actors (policymakers and bureaucrats) support and promote vocational education as a fully viable and credible alternative to academic (higher) education. This commitment can be expressed in different ways. One example would be public subsidies to firms to promote employer involvement in VET. This is a form of direct intervention of the state to address the collective action problem of skill formation: Firms' costs for providing a collective good in the form of vocational training are compensated by the state. As a second example, the state can institutionalize authoritative mechanisms of skill certification to make occupational skills comparable and therefore portable across firm contexts. This aspect is related to the degree of vocational specificity (Blossfeld, 1992) in the education system (i.e., the extent to which vocational training is certified in the form of recognized training occupations or occupational profiles). Third, state authorities can set up monitoring and accreditation procedures to ensure a high level of quality in the provision of training, either by supervising training firms themselves or by working together with employers' associations, chambers, and trade unions.

The combination of firm involvement in and public commitment to vocational training yields four possible combinations, which can be regarded as ideal-type models of skill formation systems in advanced (postindustrial) democracies. The first of these is the *liberal skill formation regime,* which combines a limited degree of public commitment with a low level of employer involvement in vocational training. A good real-world example of this regime would be the USA. In this regime, there is little willingness to promote VET as a credible alternative to higher education, and, partly as a consequence of this, firms are reluctant to invest in skill formation, because the collective action problems mentioned in this chapter are particularly pronounced in an institutional environment of liberalized and deregulated labor markets.

This situation is different in the *segmentalist skill formation system,* of which Japan as well as other Southeast Asian countries such as South Korea are the closest real-world examples, although these countries seem to be moving toward the liberal pole in recent years due to ongoing expansion of academic higher education. In the segmentalist system, there is a high degree of firm involvement in the financing and provision of VET, which does not necessarily imply that the content of the skills is highly firm-specific. However, the real portability of skill sets across firms is limited by a lack of authoritative mechanisms of skill certification and weakly developed occupational labor markets—hence, the segmentalist (and not collective) nature of the system. The segmentalist regime resembles the liberal regime in the low degree of public commitment: The vocational specificity of the education system is low (i.e., the system is geared toward the provision of academic education on the upper and postsecondary levels).

In contrast, public commitment to promoting VET as an alternative to academic higher education is high in the *statist skill formation regime* (real-world examples would be France, Sweden, or Belgium). In this case, vocational tracks at the (upper) secondary level are institutionally well developed and generally accepted as an alternative to academic education. VET is fully integrated into the secondary school system, so that transitions from VET to higher education are usually smoother compared to in collective skill formation regimes. As a consequence, academic drift is more pronounced in statist than in collective skill formation regimes (Powell & Solga, 2011). Because of the strong dominance of the state in providing and financing VET, the degree of employer involvement is low, even though some countries such as France and Sweden have repeatedly, but largely unsuccessfully, tried to resuscitate employer involvement (Culpepper, 2003; Lundahl, Erixon Arreman, Lundström, & Rönnberg, 2010).

Finally, *collective skill formation regimes* combine a high degree of employer involvement in VET with a significant public commitment to vocational training, expressed in different ways. Compared to the other skill formation regimes, the collective regime may be more fragile and fraught with tensions between employers, unions, and the state, who are all involved—to different degrees in different countries—in the corporatist governance framework of the training regime. This is why there are relatively few real-world examples of this type of regime (e.g., Germany, Austria, and Switzerland, but also to a certain extent Denmark, the Netherlands, and Norway). Public commitment to VET is mostly directed at supporting firms in providing training, for instance by establishing and maintaining a corporatist governance framework, including institutions in charge of skill certification, updating of occupational profiles, and quality assurance and monitoring, but also to a certain degree by providing subsidies to training firms. In the collective system, intermediary associations such as employers' associations, chambers of commerce, crafts and industry unions, as well as trade unions occupy a central role in the governance structure, which provides strong social and political incentives for individual employers to commit to training.

Public Policies and Skill Formation

The "Typologies of Skill Formation Systems" section introduced a typology of skill formation systems that may be useful in making sense of the variation of skill formation regimes in advanced (post)industrial democracies. But which factors explain why countries end up on different development paths, even though policymakers are often confronted with similar socioeconomic challenges? In this section, we introduce central arguments in the scholarly literature that ascribe these cross-country differences in the institutional design of skill formation systems to historical and contemporary differences in the balance of power between labor and business, in both the economic and political arenas.

A prominent approach in comparative welfare state research is power resource theory (Esping-Andersen, 1985; Korpi, 1983; Stephens, 1979). According to this theoretical perspective, cross-national differences in the generosity of welfare states are systematically and causally related to the political power of labor interests. Simplifying greatly, the welfare state is (or has become) more generous in

countries with strong trade unions as well as powerful social democratic parties, when these have been in charge of government over long periods of time. A related theory—partisan theory—argues that the partisan composition of governments makes a difference with regard to the kinds of policies that are decided and passed (Castles, 1982; Hibbs, 1977; Schmidt, 1982, 1996). Left-leaning governments—representing the interests of low-income citizens—would be more inclined to expand the welfare state and tax the rich, whereas the opposite holds for right-wing bourgeois parties.

These theoretical perspectives can also be applied to the study of education. Even though education had been a long-neglected field in comparative public policy research (Busemeyer & Trampusch, 2011), there has been a strong upsurge of scholarly interest in recent years. In this literature, the role of political parties in government has been identified as one important factor explaining differences in policy output across countries as well as over time (Ansell, 2010; Boix, 1998; Busemeyer, 2015; Garritzmann, 2016; Gingrich, 2011; Schmidt, 2007). So far, however, most attention has focused on the politics of higher education (Ansell, 2010; Garritzmann, 2016), general secondary education (Boix, 1998; Gingrich, 2011), or even early childhood education (Bonoli & Reber, 2010). Only a few studies are explicitly devoted to the study of the partisan politics of VET (Busemeyer, 2015; Busemeyer & Vossiek, 2016), even though there is related work on the political economy of VET, which focuses on issues such as Europeanization (Trampusch, 2009, 2010), employers (Culpepper, 2007), or the role of the state more generally conceived (Martin, 2012; Trampusch, 2014).

The lack of studies of the partisan politics of VET may be related to the fact that previous work in the field has mainly focused on the interactions and political conflicts between labor market interests and "the state," defined in a more abstract manner. Most importantly, Thelen's (2004, 2014; see also Culpepper & Thelen, 2008) influential work on the political economy of vocational training identifies a number of political cleavages, along which conflicts about the institutional design of training systems have played out historically. In a nutshell, she argues that differences in the organizational structure of labor unions as well as cleavages between large and small firms in the employers' camp matter (see the discussion in the first section of this chapter): Countries with strong crafts unions (e.g., the UK) were plagued by more intensive industrial conflict between employers and unions, because crafts-based unions used apprenticeship training as an instrument to regulate and delimit access to markets for skilled labor with the goal of raising skilled wages. At the end of the day, however, this contributed to the long-term decline of skilled labor (including apprenticeship training) as employers sought to replace it with physical capital (Gospel, 1994, 1995). In countries with a tradition of industrial unionism, such as Germany, the issue of skill formation was less contested across the class divide (because industrial unions organized members of different occupations), which paved the way for cross-class cooperation, facilitating joint investment in vocational skills. However, even in Germany, establishing formal modes of cooperation between unions and employers in VET was a politically contentious process, with the involvement of unions being recognized on a statutory basis only with the 1969 enactment of the Federal Law on VET (Busemeyer, 2009b). Also, conflicts

between large employers keen on maintaining a high degree of autonomy for firm-based training schemes (i.e., promoting segmentalist solutions) on the one hand and small and medium-sized firms on the other, which were more interested in establishing occupational labor markets and collectivist solutions, have influenced the historical development paths of skill formation regimes (see Culpepper [2007] for a more recent application of this argument in the politics of VET).

As can be seen from this brief discussion, the state is largely absent from this theoretical framework: Political conflicts about the institutional design of VET are fought in the economic/labor market arena. More recently, Martin and Thelen (2007) acknowledge that state actors might play a crucial role in the politics of VET, in particular in CMEs, by "forging and sustaining broad national coalitions that link—rather than separate—diverse interests" (p. 4). From this perspective, state actors in CMEs are actively involved in managing and forging cross-class cooperation between unions and employers, which is regarded as a necessary condition for the continued political and economic survival of vocational education. This strand of thought is continued and expanded in Thelen's recent work on *Varieties of Liberalization* (Thelen, 2014), which also contains case studies of institutional change in VET. In her theory of "producer group coalitions," two factors are crucial: first, the inclusiveness of interest associations (i.e., whether they represent broad coalitions of workers and employers, or not); and, second, the level of state capacity. The latter is crucial "to actively broker— with carrots and where necessary sticks—encompassing deals that overcome both internal divisions within the relevant interest associations (unions and employer associations alike) as well as between the two" (Thelen, 2014, p. 24).

The recent attention to the role of the state is important and welcome. However, the theory of producer group coalitions entails a particular understanding of the role of the state, which is more concerned with the institutional capacity of "the state" to act autonomously on behalf of collective interests against the encroachment of special interests. Opening up the black box of the state reveals that state actors are not only bureaucratic actors but also (and maybe even primarily) partisan actors, representing different interests of voters and associations in the political arena. Thus, "the state" is not a neutral actor, but, as a legitimate representative of interests, it selectively privileges some types of interests over others. Hence, in addition to the dimension of state *capacity,* which circumscribes the set of instruments state actors can use to promote policy and institutional change, it seems necessary to add a second dimension of *partisanship,* which refers to actors' *willingness* to actually use these instruments for certain purposes.

Building on and combining the insights of partisan theory as well as VoC scholarship (Busemeyer, 2015; Iversen & Stephens, 2008), there is a case to be made that differences in the balance of power between political parties during critical junctures have had a lasting impact on the institutional development of skill formation systems. However, party politics did not play out in an institutional vacuum, but was deeply influenced by policy and institutional legacies, which to a certain extent defined the menu of options that partisan policymakers could choose from at a given moment in time. For instance, applying the basic

logic of partisan theory (Castles, 1982; Schmidt, 1996) to the field of VET, it would be expected that left-wing parties promote the educational interests of low-income voters as well as those of skilled workers in the (lower) middle classes. In general, this implies a strong role of the state vis-à-vis private actors and service providers, because public involvement seems to ensure a more equal distribution of benefits and services. With regard to VET policy, left-leaning governments would be in favor of a stronger involvement of the state in the provision and financing of VET. Left-leaning governments should also be in favor of supporting VET as an alternative to academic education, as long as access to higher education remains limited to the upper strata of society (Ansell, 2010). Depending on the country context, there are more or less strong ties between left-wing parties and trade unions. It is to be expected that left-wing parties' enthusiasm for VET as an alternative to academic education will be more pronounced when ties to unions are stronger. Once a critical threshold in tertiary enrollment is crossed and academic higher education is transformed from an elitist to a mass system, left-wing governments should strongly be in favor of promoting academic education instead.

These expectations fit quite well with real-world examples. The dominance of social democrats in government in many Scandinavian countries in the second half of the twentieth century can explain why these systems are classified as "statist systems," in which the state dominates but VET continues to play an important role at the upper secondary level. In Germany in the 1970s, the first federal government headed by social democrats and liberals was also keen on increasing the role of the state in VET by fully integrating vocational education into the general secondary school system and by increasing the state's capacity to monitor and steer firm-based apprenticeship training, because unions and social democrats feared employers might use apprentices as inexpensive substitutes for skilled labor (Busemeyer, 2009b). A contrasting example is provided by the turn of the UK's New Labour party under Tony Blair away from the promotion of VET toward higher education in the 1990s (King & Wickham-Jones, 1998). This example shows the constraining impact of the institutional environment. In a liberal setting, several attempts of resuscitating the firm-based apprenticeship had failed before, so that the Labour Party regarded the expansion of access to higher education as a superior and more viable policy to promote the educational interests of their electoral supporters.

The impact of the institutional context on party strategies, preferences, and choices is even more apparent when comparing the policies of right-wing parties across countries, although differences in ideology matter as well. According to the logic of partisan theory, right-wing parties promote the interests of business and wealthy individuals. In education policy, this would result in policies that limit the role of the state in VET as well as policies that maintain educational privileges of the well-off (e.g., by supporting private education institutions or by limiting access to academic higher education). Depending on institutional context (as well as ideology), right-wing parties have pursued similar goals with different policies. In the UK, for instance, the Conservative Party was keen on promoting employers' interests in VET while limiting the influence of the state, and regarded vocational training primarily as a tool to fight youth unemployment

rather than as a means to further the educational advancement of those in the lower half of the skills distribution (King, 1993). In contrast, German Christian Democrats, which had been in power for long periods of time during the second half of the twentieth century, actively promoted a "politics of mediation" (Van Kersbergen, 1995) by facilitating cross-class compromise between employers and unions, in particular in the field of vocational training. Thus, German Christian Democrats refrained from intervening unilaterally on behalf of employer interests, while at the same time protecting the autonomy of firms in decisions related to apprenticeship training.

These brief examples also show that partisan conflict over the design of VET policies is not only about the content of policies themselves, but also about the effects of these policies on the balance of power between the state and labor market interests as well as between economic actors themselves (Busemeyer & Vossiek, 2016; Dingeldey, 1996). By turning VET into a tool of labor market rather than education policy and by reforming the governance structure of VET in the 1980s to privilege business over union interests, the British Conservative government of that time clearly aimed at weakening the political influence of labor unions. Vice versa, the corporatist approach to VET policy pursued by the Christian Democrats in Germany stabilized the position of unions as a "junior" partner in policymaking. It was—ironically—the federal government of the social democrats and the Green Party that partly broke with the "consensus principle" against the opposition of unions, because the latter had become an obstacle to necessary modernization reforms from the perspective of policymakers (Busemeyer, 2012). All of these examples show how political conflicts about the design of reform of VET institutions span across the divide between the economic and the political arenas and that variations in the balance of power between labor and business continue to be a relevant explanatory variable for variation across time and countries.

Conclusion

This chapter has mapped the main concepts and findings of the comparative political economic literature on the politics of vocational training. The politics of vocational training in the economic sphere deals with firms' and workers' preferences in vocational training and their underlying material interests as well as how these are affected by but also aggregated and processed in labor relations. In the political arena, the focus is on how interest groups (mainly business groups and unions), political parties, and state authorities transform firms' and employees' preferences on training into public policies and how these policies might feed back on the balance of power between actors in the economic arena.

It is clear that the economic and the sociopolitical perspectives on skills exhibit different conceptions of how skills and power relationships between labor and capital are interrelated. Economic concepts take skills as a starting point and view them as an exogenous factor affecting the power relationships between different types of workers (with different types of skills) as well as between unions and employers. However, the sociological and political science literature on trade

unions, institutional labor economics, and industrial sociology argues that skill formation, and power relationships among workers and between workers and employers, are closely and mutually interrelated. Skills not only affect the power distribution on labor markets but also are influenced by them. Immigration may undermine national, sectoral, and regional training institutions and history, and contemporary politics provides us with lots of examples of how governments and employers make use of migrant workers to compensate for labor and skill shortages, such as the guest workers schemes and the programs for workers from colonies in Western Europe in the 1960s, but also the free movement of labor in the EU or the recent EU Green Card initiative for recruiting IT specialists, have demonstrated.

For sure, education and training systems in OECD countries have come under pressure recently because of globalization, migration, and the digital revolution. Even though political struggles have played a crucial role in their historical development, well-established VET systems in the Continental European countries now enjoy widespread support among both citizens and political elites. VET systems will have to change to meet these new challenges, preserving their particular strengths in doing so, but there is reason for cautious optimism that they will be able to do so. In the long term, the biggest challenge will be to convince young people and parents that VET remains a credible and attractive alternative to academic higher education.

In the wake of the current influx of labor and refugee immigrants into various European countries, (non)populist parties opportunistically and successfully use the notion of a migration crisis to win votes and offices and as well referenda against labor mobility (e.g., Brexit). Even though the UK (together with Sweden and Ireland) was the only country to fully embrace labor mobility without reservation after the Eastern enlargement of the EU in 2004 for economic reasons and because of its weak training system, British politicians have recently raised concerns about a migration control crisis, which they also linked with a skill provision crisis (Paul, 2016). In the context of this debate, in 2010, the British Home Office even declared that it intends to link access to migrant sponsorship licenses to employers' investments in training at home (Paul, 2016). This case illustrates how on the back of populist debates on migration, political initiatives to strengthen the training system are catalyzed, and how labor migration may produce some kind of protectionism in national training policies. That we observe this tendency in a country in which collective resources to sustain employers' commitment to training are meanwhile nearly nonexistent is no surprise.

More generally, our discussion of the politics of skill formation demonstrates that political conflicts about the institutional design of skill formation systems are ubiquitous. This may also explain why improving and "optimizing" education and training systems according to rationalist or "best-practice" models is so difficult in practice. Policy choices are always inherently related to distributive conflicts between the major stakeholders in the system—employers, unions, bureaucrats, and party politicians. But rather than dismissing the *political* nature of these conflicts as "irrational," it is important to acknowledge the fact that they are in fact not irrational, but play out according to a different—namely, a political and therefore distributive—logic. Scholarship in comparative public policy and

political economy research gives us the theoretical and empirical tools to analyze these dynamics, and we hope that this chapter contributes to advancing an interdisciplinary understanding of these matters.

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9

The Industrial Relations of Training and Development

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Introduction

Training and development are central features of industrial relations. First, employers' investment decisions in training and development are often influenced by the wider institutions of industrial relations, both at and beyond the workplace. For example, in many countries, training provision (in terms of content, activity, and outcome) is actively framed and negotiated within established structures of collective bargaining between employers and trade unions, at either the sectoral or workplace level, as well as by wider legislative enactments. Second, particular training practices may, in themselves, generate industrial relations concerns around training opportunities, access, utilization, and reward. Notably, employers and employees may have different interests in the type of training provided and the perceived benefit of such training. Institutional arrangements are thus an important means by which particular differences of interest around training and development can be reconciled (Rainbird, 2012). Moreover, for Bosch and Charest (2010), the "close involvement of the social partners" is important in ensuring that training and development are closely linked with the labor market, "good pay," and career opportunities within the firm (p. 23).

This chapter examines contemporary interest in the industrial relations of training. To some extent, at a rhetorical level at least, this interest has intensified in recent years. At the level of policy, the virtues of the "knowledge economy" or the "skills race" are often extolled as a shared endeavor, seemingly free from any form of contention. Indeed, some commentators assert that, in policy terms, training, learning, and skills investments can be seen as benign political goals that have largely displaced the more contentious, historical agenda of

redistributive politics through tax and welfare reform and demand management (see Cutler, 1992). As Garsten and Jacobsson (2004) elaborate,

> The shift of focus in labour market policy discourse from 'lack of employment' to 'lack of employability' illustrates a shift in problem perception and in policy from demand-orientated policies to promote full employment to supply-orientated policies to promote 'full employability'. It also illustrates a shift from a systemic view of the labour market to a focus on individuals and their qualities. (p. 2)

Training in this sense is seen as a central component of government supply-side reform, aimed at increasing the quality and quantity of human capital (i.e., skills) available in the labor market, typically through increasing access to systems of qualification. Problematically, demand, by employers, for such supply is assumed to be causally derived—more supply stimulates more demand. Because this policy shift—and the supply-side agenda of training, learning, and skills—is seen as benign, beneficial, and of value to all stakeholders in society, it is often portrayed as an agenda around which representatives of capital and labor can forge new social settlements. In essence, employers and workers' representatives (often referred to as the *social partners* or *actors*) are exhorted to build new competitive strategies around continuing learning and skills upgrading (Mathews, 1993). This was evident, for example, in the European Commission's (2001) policy for lifelong learning in the early 2000s that stated, "The social partners are invited to negotiate and implement agreements at all appropriate levels to modernize the organization of work, with a view to increasing investment in lifelong learning and to provide more time for learning" (p. 21). In addition to new collaborative training "partnerships," in cases such as the UK, learning and skills have also been positioned as issues around which trade unions can develop a new and "modern" role (Rainbird, 2005). At the level of policy, then, training and development are central to a contemporary emphasis on supply-side industrial relations (Martinez Lucio, Skule, Kruse, & Trappmann, 2007; Stuart, 2007).

As this chapter will reveal, the prescriptions underpinning the rhetoric of "supply-side industrial relations" cannot be taken at face value. Just how new arrangements between the social partners around training and development are forged will be mediated by wider power dynamics and societal and institutional configurations. The ability of employers and workers' representatives to develop meaningful and innovative arrangements for training and development often depends on evolved and viable structures of cooperation that take different forms across nation states (Bosch & Charest, 2010). Yet, regardless of the extant institutional structures of industrial relations, the development and implementation of learning and training initiatives increasingly present the social partners with a new set of tensions and challenges that need to be addressed, as they seek to respond to the demands of ongoing organizational restructuring and labor market change (Stuart, 2007, p. 270). As Martinez Lucio et al. (2007) note, although a "new discourse on skills is emerging, along with shifts in the ways workers are trained and retrained" (p. 337), this is a complex and contradictory process.

The chapter will explore the industrial relations of training and development through four further sections. The "Market Failure and the Regulation of Training and Development: Situating Industrial Relations" section sets out the logic for an *industrial relations of training*, noting the role that institutional configurations, which may vary by country, can play in mediating potential market failures around training and development. The "Industrial Relations and Training in Britain: Toward a New and Modern Role for Trade Unions" section presents a detailed historical case of industrial relations and training development within the UK context, paying particular attention to recent initiatives around union-led learning (Rainbird & Stuart, 2011). The "The Industrial Relations of Training in Comparative Perspective: European Developments" section expands the scope of investigation to consider recent initiatives by the social partners within a number of European economies, paying close attention to emerging challenges and tensions. The final section makes some concluding remarks.

Market Failure and the Regulation of Training and Development: Situating Industrial Relations

Training Systems and the Regulation of Collective Goods

The linkages between systems of industrial relations and training and development have long been recognized (Coates, 2000; Finegold & Soskice, 1988; Hall & Soskice, 2001; Lloyd & Payne, 2016; Maurice, Sellier, & Silvestre, 1986). Evolved structures of industrial relations are understood to be part of the institutional complex that makes up different "national specificities" (Maurice et al., 1986) or "Varieties of Capitalism" (Hall & Soskice, 2001), which, in turn, are interlinked with and can affect systems of training and development within countries. Important elements of the institutional complex include the system of education and training (including management education), corporate governance, interfirm relations, industrial relations, the wider tenets of the welfare state, and so on. From this, commentators tend to differentiate economies by the degree of institutional coordination and embeddedness, as in the Varieties of Capitalism approach, for example, which differentiates between "coordinated economies" (such as Germany) with high levels of institutional regulation and "liberal market economies" (such as the UK), where the institutional complex is weak and economic activity is coordinated primarily through market mechanisms.

Although approaches such as Varieties of Capitalism are often criticized for their functionalist logic (see Lloyd & Payne, 2016), it is commonplace for analysts to associate levels of institutional coordination and regulation within countries with training and skills outcomes and, accordingly, to identify different types of vocational education and training (VET) systems. As Ashton (2004) notes, "[N]ational VET systems take their determining characteristics from the underlying relationship between the state, capital and labour" (p. 21). How such systems have evolved and the accompanying relationship between regulation and training outcomes are thus key points of interest. Ashton (2004) identifies

three models of VET. The first is the *free market model*—or liberal market model—where the regulation of training and institutional coordination is left to the market, with the state playing a limited role, intervening only in relation to market failure or in terms of youth training. This is exemplified by the "voluntarism" of the UK model and also the USA, whereby decisions around training investment are largely left to employers and, to a lesser extent, individuals. The second is the *corporatist model*, where the state historically has played a more active and "mediating" role in shaping training investment decisions and economic growth through a more cooperative relationship between capital and labor. This is typified by approaches in economies such as Germany and the Nordic countries. Industrial relations are more highly regulated, and training provision—notably apprenticeships—is overseen through denser institutional arrangements, at all levels of the economy, that involve capital, labor, state agencies, and providers. The third model is that of the *developmental state* (for a detailed discussion, see Chapter 11, this volume), characteristic of the late industrializing economies of Southeast Asia (Ashton & Green, 1996). In these economies, the state has played a key leadership role in the development of industrial strategies and paths to economic growth.

Streeck (1989, 1997) has given detailed consideration to the reasons why regulation in VET decisions matters. For Streeck, decisions relating to training investment are increasingly determined at the level of the workplace, with competitive success dependent on the utilization of broad and high skills, which need to be produced in abundant supply beyond levels of current need (what are termed *redundant capacities*). Yet, if left to their own devices, it is rational for firms to underinvest in such skills, because trained workers are free to leave the firm and competitors are able to poach such skills. To address this classic collective-good dilemma, Regini (1995) argues that it is necessary "that the vocational training system should be highly institutionalized, with appropriate legislation and strong unions which oblige firms to pursue collective long-term interests" (p. 192). Thus, systems of VET based on the market model, such as the UK, are seen to systematically underinvest in training and skills, in contrast to the more densely regulated economies like Germany, which tend to produce high levels of skills because firms' investment decisions are bound in an institutional context of "beneficial constraints" (Streeck, 1997). Such regulatory constraints are seen to be beneficial, as they enable firms to develop mechanisms to internalize investments in skills and develop more innovative and quality-oriented systems of production (Streeck, 1992), which help avoid knee-jerk responses to economic crises, whereby investment in training is traded for labor redundancies (Lloyd, 1999).

Training and the New Industrial Relations

The emphasis on industrial relations in models of economic governance and VET centers on the degree of coordination and cooperation between representatives of capital and labor. This was clear in Finegold and Soskice's (1988) seminal critique of the failures of training in Britain, which identified industrial relations

as one element of a "self-reinforcing network of societal and state institutions that interact to stifle demand for improvements in skill levels" (p. 22). Industrial relations was seen as one of the two "major forces impacting" (along with the financial market) managerial decisions about whether to invest in training or not (Finegold and Soskice, 1988, p. 29). Yet, for Finegold and Soskice (1988), historically the "structure, traditions and common practices of British industrial relations have undermined attempts to improve the skills of the workforce" (p. 29). The main reasons for this were the inability of the social partners (i.e., employers and unions) to develop coordinated policy with government and the neglect of training in the collective bargaining process, much of which could be explained by the weak coordinating role of both employer organizations and the peak trade union body, the Trades Union Congress (TUC). This stands in contrast to the more coordinated and cooperative structures of industrial relations that have evolved historically in countries such as Germany. Although this position can be taken as something of a conventional wisdom, it is important to note that analysis of industrial relations and training, either within nation states or comparatively, is often rather limited. Training outcomes tend to be associated with the extent of coordination or cooperation or the existence of formal arrangements, typically at a macro level, which exist for dialogue between capital and labor. Often, less attention is given to industrial relations practices; to the struggles, at the workplace level, of developing initiatives around training provision; or to the challenges that are faced when implementing VET policies within firms.

Although it is clear, then, that different national models of VET do exist, with either more or less supportive systems of industrial relations, it is an open question just how suited, or adaptable, existing systems of regulatory governance are to contemporary training and skills demands. For Martinez Lucio et al. (2007), all established national systems face new challenges around the changing definition of skill development and the need for continuing training and learning. Notably, they claim that new skill demands place less emphasis on initial systems of training, which are often easier to systematize, measure, and regulate, and bring into focus learning and competence of an informal and nonformal kind. This is seen to pose a direct challenge for systems of regulation, governance, and interest articulation, because, as Crouch, Finegold, and Sako (1999) explain, "although the changeability and flexibility of new skill concepts are shifting emphasis towards *further* rather than initial VET, it is difficult to organize neo-corporatist involvement of the former" (p. 221, emphasis added).

Nonetheless, the social partners are increasingly exhorted to engage with the challenges of the contemporary skills and training agenda as a means to respond to rapid economic change, continuous corporate restructuring, and the need to improve competitiveness. As noted, this is a central agenda of policymakers, at a supranational level such as the European Union (EU) but also, increasingly, at the nation state level. But it is not just a concern of policymakers. Academic debate too has placed training and skills formation as a central feature of the new industrial relations. Windolf (1989) argues that new technology, economic uncertainty, and changing market conditions increase pressure for the decentralization

of decision making. Consequently, firm-level "productivity coalitions" (or micro-corporatism) become common as employers seek increased flexibility of labor. Such productivity coalitions don't necessarily replace established structures of institutional coordination, but they are central to new arrangements between capital and labor that focus on production and employment relations, with particular emphasis given to the beneficial contributions of training, skills, and labor flexibility. This "new" or "supply side industrial relations" (Stuart & Wallis, 2007) is often presented as an agenda that can be best furthered through cooperative or partnership-based approaches.

Trade unions are also encouraged to engage with such productivist concerns as a means of strategic innovation and reinvention (Mathews, 1993). Yet, although there are seemingly strong pressures on unions to engage in innovation around skills and learning, this is not without its challenges. The logic of the skills agenda for trade unions can be simply put. Faced with difficult environmental conditions and, in most developed economies, a declining membership base, training, learning, and skills are seen to offer a route to develop "mutual gains" strategies (Kochan & Osterman, 1994). In contrast to the traditional "distributive" agenda around pay and conditions—which is increasingly harder for unions to deliver—training presents an opportunity to develop new integrative agendas around which unions and employers can cooperate and work in partnership. Essentially, all parties to the employment relationship—employers, unions, and employees—are interested in training and stand to benefit from investment: Employees get new skills, employers get more adaptable and productive employees, and unions get increased organizational legitimacy and potentially new members. Outcomes are thus "positive sum," rather than the "zero-sum" approach of distributive bargaining around pay, where one party gains at the other's expense (Stuart, 1996).

According to Streeck (1992, p. 251), this image of a "new industrial relations" is "dangerously simplistic." First, although all parties to the employment relationship may have an interest in training, this does not mean that their interests are identical. For example, employers may see training as a way to develop specific skills that have business benefit, regardless of how this affects the general conditions of employees, whereas employees may desire training that has wider applicability, whether as a means for progression at their current place of employment, for their employability more generally, or simply as a matter of personal interest. Second, engagement with employers around training could pose risks for trade unions. As Streeck (1992) explains, training is often framed within a wider logic of unions cooperating with management around "restructuring, in rebuilding competitiveness, improving quality, increasing productivity, and so on" (p. 253). This cooperation could mean in a practical sense that unions do no more than advocate the benefits to their members of engaging in training against an organizational backdrop determined by management. As a consequence, unions "run the risk of being torn apart by identification of their members with the competitive needs and interests of their employers" (Streeck, 1992, p. 253). This is not to suggest that unions should be opposed to engaging with the training agenda, as it presents considerable opportunities. The point is that any opportunities that may arise from broad investments in training and learning at the workplace are best realized within some wider structure of constraints. As Streeck (1992) elaborates,

> Independent union intervention in cooperative training and human resource policies must combine the imposition of institutional *constraints* on managements that foreclose low-skill, low wage paths of industrial adjustment, with the creation of institutional *opportunities* for managements to pursue successfully a high-skill and high wage-policy. (p. 263, emphasis in original)

Streeck (1992) advocates, therefore, that any union role in the industrial relations of training should be based on a degree of union strength and conflictual cooperation. Examples of what *conflictual cooperation* means in a practical sense can include the following: the defense of a high and flat wage structure (i.e., wages that are high with little dispersion between different wage levels within a company); standardized and obligatory training curricula at the workplace, with effective enforcement mechanisms; the defense of employment security; links between rewards and knowledge accrual; positive strategies for work organization and job redesign; and negotiated training and retraining plans with workforce entitlements to training.

Streeck's (1992) analysis and prescription were, however, set against a very particular set of developments within key sectors of the German economy. The key question that will be explored in the remainder of the chapter is to what extent such union strategies of conflictual cooperation are applicable to developments in the industrial relations of training in other national contexts. The chapter first turns to the British context to highlight how the political, economic, and social environments within a country shape the relationship between industrial relations and training. It then evaluates recent initiatives around union-led learning, which can be seen to represent a novel departure by the state given the British tradition of voluntarism.

Industrial Relations and Training in Britain: Toward a New and Modern Role for Trade Unions

Historical Developments in Training Policy

The British training system is typically described as voluntarist (Grugulis, 2008). Historically, this meant little by way of institutional coordination between capital, labor, and the state, and similarly, the state tended to stay out of the regulation of training provision. The central assumption was that decisions around training investment were best left to employers and employees (or their representatives) to decide. In a practical sense, this meant that employer prerogative prevailed, with a subordinate role for the state confined to basic education (Ashton, 2004; Sheldrake & Vickerstaff, 1987). The main consideration for unions was the regulation of apprenticeships as a means to control entry into specific trades. The notable exception was the period between 1964 and 1979, when the state sought to intervene more strategically amid concern over the faltering state of the UK economy and mounting criticism of the perceived rigidities of traditional craft apprenticeships. The Industrial Training Act was introduced in 1964

and led to the creation of 27 Industrial Training Boards (ITBs). ITBs were governed by a social partnership model involving representatives from employers and trade unions, although there was no official representation from the state (Sheldrake & Vickerstaff, 1987). Higher levels of training provision were encouraged via a complex levy–grant system, designed to act as a "redistributive tax on training" (Rainbird, 1990, p. 11). This was replaced in 1973 with a levy exemption system and the Manpower Services Commission (MSC) established to oversee the ITBs. The MSC operated on a tripartite basis, with representatives from industry, unions, and education. The overall effectiveness of the ITBs has been a matter of some debate (Pemberton, 2001; Sheldrake & Vickerstaff, 1987). Practically, they tended to focus on maintaining apprenticeships and eschewed wider attempts at training reform, leading some commentators to question their overall ability at dealing with deeper problems in the British training system.

From 1979, a series of Conservative governments sought to dismantle the limited basis of social partnership that had been established around training. Seventeen ITBs were abolished in the early 1980s, with the remainder dismantled at the end of the decade, leaving two in construction and (construction) engineering. The MSC was abolished in 1989 and replaced with locally based, employer-dominated Training and Enterprise Councils (TECs) and, at the sector level, a series of Industry Training Organizations (ITOs). Trade unions were to have no, or a very marginal, role in the new system. According to the government at the time, the TEC initiative was to allow for a more efficient alignment of the supply of training with the demand for skills:

> The creation of TECs is a truly radical step. It will give leadership of the training system to employers, *where it belongs*. By increasing employer responsibility … TECs will ensure that training provision is more relevant to employers' needs and so improve the skills and enterprise of the workforce.… As employers recognise the economic necessity to train and the return available, they will be encouraged to make larger investment in training (Department of Employment, 1988, p. 43, emphasis added)

This policy shift was predicated on an act of faith: that putting employers in control of the training system would be highly efficacious. It also proved to be fundamentally misplaced. In the years that have followed, successive governments have felt the need to introduce numerous reports on skills, training, and learning that have all felt the need to reassert the central missive that "employers are in charge," while tinkering again and again with the overarching structures of the training system. Employers for their part have been largely unmoved by the rhetoric of policymakers and left confused by the constant need for reinvention. The response of critics that Britain has not broken out of a low-skills trap largely remains the same, with little evidence to suggest that employer leadership has transformed investment in training provision (see Lloyd & Payne, 2016).

National, regional, local, and industry bodies for training have all been subject to constant reinvention since the early 1990s. Following the election of a Labour government in 1997, the TECs were abolished (in 2001) and replaced by a national Learning and Skills Council (LSC) supported by 47 regional LSC boards,

responsible for not just the provision of work-based training, but also VET in further education and sixth form colleges and local authority adult education (Clough, 2012). There was some union representation on the LSC at both the national and regional levels, albeit on a minority membership basis. The LSC was disbanded in 2010 and replaced by the Skills Funding Agency and the Young Peoples' Learning Agency, the latter of which was disbanded in 2012 and replaced by the Education Funding Agency. Sectorally, the ITOs were replaced by National Training Organizations, then (initially 25) Sector Skills Councils (SCCs) tasked with boosting skills and workforce productivity through Sector Skills Agreements. They currently fall within the remit of the Federation for Industry Sector Skills and Standards and have nominal union representation on their boards.

At the same time as trade unions were being excluded from policy formation during the 1980s, they started to give increased emphasis to training and learning as future strategic priorities. Individual trade unions, such as the Manufacturing, Science, and Finance Union, campaigned for workplace training committees, while the TUC was to make "developmental" issues a central feature of its "new bargaining agenda" for the 1990s (Stuart, 1996). The aim of the TUC's training agenda was to focus on equal opportunities, payment for skills, and a minimum quota of training days per year, to be achieved procedurally through specific agreements and training committees. Despite this seeming shift in focus, trade unions had little success in extending the bargaining agenda to encompass training and development issues. For example, a detailed examination of company and sector collective agreements by Claydon and Green (1994) found that just 40 agreements, out of 944, made any explicit reference to training issues between January 1991 and June 1993.

Nonetheless, the union movement actively lobbied the Labour Party prior to its election in 1997 over the value of a union role in training. Once in power, Labour introduced a number of initiatives designed to increase the influence of trade unions in the development of the skills agenda. The consultation exercise for the government white paper *Fairness at Work* (Board of Trade, 1998) asked "whether training should be among the matters automatically covered by an award of trade union recognition" (para 4.18). The reaction of employer bodies was unanimously hostile, with all opposing the inclusion of training in the bargaining agenda on the basis that this had led, historically, to restrictive practices in relation to access to occupations, multiskilling, upskilling, and progression based on merit. Employers' voices held sway. Consequently, subsequent legislation did not include a mandatory requirement for employers to bargain on training, although a duty was placed on employers to consult and inform any (newly) recognized union on training matters.

Trade unions were, however, to get a more concrete result from the consultation for the 1998 green paper on lifelong learning, *The Learning Age* (DfEE, 1998). This envisaged a new partnership for learning in the workplace involving employers, employees, and trade unions. As a result, the Union Learning Fund (ULF) was established. This was a competitive grant to which unions could apply to facilitate learning initiatives for the benefit of their members. Despite repeated suggestions that the ULF would be abolished following the departure of the Labour Party from power in 2010, it has continued to the present day and, as of 2016–2017, was in its 17th funding round.

The early rounds of the ULF focused on initiatives to raise demand for learning among members with basic skills needs. A new role for a "union workplace advocate for learning" was also trialed. This received statutory support under the 2002 Employment Act, and Union Learning Representatives (ULRs) were introduced in 2003. ULRs have the right to receive training to undertake their duties and reasonable time off work to conduct their duties. Union members also have a right to (unpaid) time off work to consult with ULRs. However, there is no right for ULRs to bargain with employers, or obligation for employers to consult with ULRs (Rainbird, 2005; Wallis, Stuart, & Greenwood, 2005). Their role is seen as operating "outside the collective bargaining framework" (DfEE, 2001, p. 2). In addition to managing ULF funding and the right for ULRs, the TUC was also to gain a more prominent role in workplace learning policy with the inception of Unionlearn in 2006. A department of the TUC, Unionlearn is funded by government and unions to provide a supportive platform for union learning activities and to administer the ULF. The key question is just how much difference these new union learning initiatives have made to the contemporary industrial relations of training.

Evaluating the Contemporary Industrial Relations of Training

According to Keep, Lloyd, and Payne (2010), the policy spheres of industrial relations and skills in Britain have become disconnected since the 1980s. A number of trends are observable. First, the influence of the collective institutions of industrial relations over the skills arena has diminished since the abolition of the ITBs and MSC in the 1980s. Second, the concerns of policymakers have shifted, away from the pressing industrial relations issues of the 1970s and 1980s to the skills agenda from the 1990s to the current day. This reflects a changing causal emphasis on how to raise the competitiveness of British industry: away from tackling perceived "rigidities" in the labor market (the so-called "labour problem"), such as trade union activity and industrial conflict, to raising human capital formation through improving the supply of skills and encouraging individual development (the "training problem"). Given this background, Keep et al. (2010) conclude that "the vast bulk of skills policy and activity" is now *outside* the industrial relations system (p. 414, original emphasis). The government regards the work of the ULRs and Unionlearn activities to be primarily part of the skills agenda rather than an industrial relations one. In a formal, institutional sense, this is without doubt the case, but a key issue for evaluation is the extent to which unions have been able to leverage the resources accrued through union learning to achieve positive outcomes for workers or to facilitate the evolution of new institutional arrangements of industrial relations at the workplace level.

The reported "outcomes" from activity funded by the ULF are detailed in Table 9.1. Unions have to report outcome data as a condition of ULF funding under the ULF. The data presented here are compiled directly from the ULF management database and only relate to England, as there are distinct funds in Scotland and Wales. Over the first 16 rounds of the ULF, unions received approximately £180 million, with an additional £93 million of "levered-in" income (typically from unions themselves) reported by unions. Although the scale of

Table 9.1 Funding and Outcomes for All Union Learning Fund Rounds (1–16).

Round (years)	ULF funding, £ (in million)[a]	Levered in funding, £ (in millions)	Total funding, £ (in millions)	Number of learning episodes	New learning centers opened	ULRs trained	Learning agreements signed
Round 1 (1998–2001)	1.02	0.45	1.47	2,172	11	734	
Round 2 (1999–2002)	2.78	0.56	3.34	4,460	15	882	
Round 3 (2000–2003)	4.73	1.64	6.37	7,322	40	1,640	
Round 4 (2001–2004)	6.49	3.23	9.72	14,330	66	1,540	
Round 5 (2002–2005)	9.16	0.29	9.45	8,800	62	2,724	204
Round 6 (2003–2006)	10.34	6.98	17.32	62,087	49	2,383	134
Round 7 (2004–2007)	13.86	9.86	23.72	67,657	229	3,799	500
Round 8 (2005–2008)	7.69	4.61	12.30	107,219	104	2,169	196
Round 9 (2006–2009)	19.39	10.37	29.76	99,854	118	3,102	245
Round 10 (2007–2010)	5.39	1.75	7.14	116,782	8	865	73
Round 11 (2008–2011)	21.05	11.37	32.42	113,092	166	3,222	255
Round 12 (2009–2011)	2.19	No data	2.19	11,094	3	281	18
Round 13 (2010–2013)	25.13	No data	25.13	289,936	129	3,485	159
Round 14 (2011–2012)	0.79	No data	0.79	9,802	0	60	11
Round 15 (2012–2015)	37.84	4.79[b]	42.63	395,508	256	3,617	356
Round 16 (2015–2016)	11.16	37.83	49.46	(137,635) 180,194[c]	176	807	153
Total rounds 1–16	**£179.01**	**£93.73[b]**	**£272.74[b]**	**1, 447, 750**	**1,432**	**31,310**	**2,304**

ULF, Union Learning Fund; ULRs, Union Learning Representatives.

[a] Figures reflect the year in which the contract started, and they could be spread over 3 years.

[b] Data on levered-in funding are incomplete, and for Round 15 they are derived from selected projects only and represent an underestimate of the total.

[c] Multiple data sources exist for the number of learners for Round 16; the figure in brackets includes data from Unionlearn Central Database (UCD) figures, including 41,841 informal adult community learning (IACL) learning episodes.

Source: Taken from Stuart et al. (2016, p. 14).

funding for union learning over the years 1998–2016 appears rather substantial, it is worth noting that the Conservative–Liberal Democrat Coalition government (2010–2015) distributed £250 million to support the Employer Ownership of Skills pilots over just 2 years (2012–2013). In recent years, there has been more of an emphasis on apprenticeships (Stuart, Cutter, Cook, Garcia, & Stevens, 2016). In total, nearly 1.5 million learning episodes have been supported, and Unionlearn has routinely set a target to encourage more than 200,000 learners through the union route. In addition, more than 30,000 ULRs have been trained, although as not all unions use ULF funding to train ULRs, the actual figure is much higher.

A key concern for unions and ULRs at the workplace level has been to embed union learning activities in the everyday processes and practices of industrial relations. Unions have thus sought to establish new institutional arrangements around union learning, typically via learning committees and learning agreements, which seek to provide space for dialogue between unions and management and help codify union learning activities. For example, learning agreements typically set out the roles and responsibilities of management and union representatives around training, the structures and timing of learning committees, and the possible entitlements of employees to access union learning and training more generally (see Stuart, 2011). Around 2,300 such learning agreements have been established since the inception of the ULF. Surveys of employers suggest that such agreements are established in around half of the cases where employers and unions engage in union learning, with a similar percentage for learning committees (Stuart et al., 2016). The ULF has also funded a significant number of new workplace learning centers (1,400 between 1998 and 2016), which act as spaces for workers to undertake learning while at work. Access entitlements to and levels of employer support for learning centers are often codified in learning agreements.

An evolving body of research has sought to examine the relative impact of union activity on training and learning (see, for example, Bacon & Hoque, 2010; Hoque & Bacon, 2011; Saundry, Antcliff, & Hollinrake, 2017; Stuart, Cutter, Cook, & Winterton, 2010; Stuart, Valizade, & Bessa, 2015; Stuart et al., 2016), including specific surveys of ULR activity and more general analyses of unions' impact on training and learning activity and outcomes. It terms of the latter, it is well established that union members are more likely to receive training than their non-union counterparts, and there is evidence to suggest that this differential increased as the British economy came out of recession (see Stuart et al., 2015). Similarly, surveys of ULRs have revealed positive outcomes, including increased involvement by unions in a range of learning activities, increased participation levels by workers in learning, and evidence of new membership recruitment (Saundry et al., 2017). These positive effects have received a degree of support from complementary surveys of workplace managers and employees. Stuart et al. (2010, 2016) found that managers, in two waves of surveys in 2010 and 2015, reported that union learning had a positive impact on levels of training investment, the climate of employment relations, and performance outcomes. A recent survey of more than 2,500 union learners (Stuart et al., 2016) found that more than half (55%) had gained a qualification as a result of undertaking union

learning, half were inspired to take further training, and more than a third (37%) explicitly asked their manager for further training. Although the impact on pay was less significant—just 11% reported a pay raise as a result of union learning— there was a clear, positive association between repeated episodes of union learning and the probability of receiving an increase in pay and/or a promotion. Perhaps most significantly, levels of deadweight associated with union learning appeared to be relatively low: Nearly three quarters (73%) of union learners reported that they would not have received learning without the active support of their union (Stuart et al., 2016).

It is, however, necessary to temper the optimism of these findings. Careful multivariate analysis shows that outcomes tend to be contingent on key contextual factors. Notably, outcomes from union learning, for example in terms of learning activity and participation rates, are more likely to be positive where unions have established a degree of joint regulation around union learning through learning agreements and, most significantly, learning committees (Bacon & Hoque, 2010; Saundry et al., 2017; Stuart, 2011). This suggests some key challenges. First, it often takes time and a degree of continuous engagement and tenacity for unions to get employers to agree to establish learning agreements and committees. In this regard, agreements and committees around learning could be seen as one of the constituent elements of conflictual cooperation advocated by Streeck (1992). Second, and relatedly, there is evidence to suggest that unions are finding it harder to establish such workplace structures. Surveys of employers show that the proportion that are establishing committees and agreements with unions around learning declined between 2010 and 2015, most significantly in terms of learning committees, which declined from 51% of reporting managers in 2010 to 40% in 2015 (Stuart et al., 2016).

Third, although learning agreements and committees can have a beneficial impact on the activities and outcomes of union learning, the most significant enabling factor for unions is formal negotiation over training and learning (Saundry et al., 2017). Saundry et al.'s (2017) analysis shows that where there was workplace negotiation over training and learning, ULRs were far more likely to report widespread involvement in learning activities, as well as positive outcomes in terms of participation in learning and the extent to which union learning supported the recruitment of new union members. Problematically, as Table 9.2 indicates, the extent of negotiation over training decisions in Britain, even in unionized workplaces, is rather low. The data, drawn from the Workplace Employment Relations Survey (WERS), show that only around 1 in 10 (9.9%) unionized workplaces negotiated around training and learning in 2011, although this represents a threefold increase from 1998 to 2011, with slightly higher proportions in those workplaces with ULRs (at 12.8%). Consultation over training is also far more likely in workplaces with ULRs, although levels declined slightly between 2004 and 2011.

In summary, although the union learning agenda has offered a new role for unions in the British workplace, the degree of joint regulation by capital and labor over training investment decisions remains limited. Unions have sought to use the resources acquired through ULF investment and the ULR role to embed learning strategy and practice through agreements and committee structures,

Table 9.2 Training, Representation, and Voice, 1998–2011: Reporting Managers (%).

	Measurement	WERS 1998	WERS 2004	WERS 2011
Union Learning Representatives (ULRs; in unionized workplaces)	Yes/no	–	9.5% **(24.7% of all ULRs)**	12.5% **(31.3% of all ULRs)**
Voice How does management deal with union representatives about the training of employees?	Negotiates	3.3%	9.2%	9.9%
	Consults	36.9%	30.5%	40.3%
	Informs	23.9%	24.3%	25.3%
	Does not inform	35.8%	36.0%	25.4%
In workplaces with a *Union Learning Representative*, how does management deal with union representatives about the training of employees?	Negotiates	–	13.1%	12.8%
	Consults	–	61.4%	55.7%
	Informs	–	17.9%	26.0%
	Does not inform	–	7.6%	5.4%

WERS, Workplace Employment Relations Survey.
Source: Culley et al. (1999); Kersley et al. (2006); Wanrooy (2013).

but the wider architecture that Streeck (1992) envisages for beneficial industrial relations of training has been absent. Unions have not proved able to defend wage structures or job security across the economy, particularly during postrecession austerity, and the development of the union learning agenda has not been integrated with wider demands for innovation on work organization and job redesign (Green, 2010). Unions in the UK lack the strength to mobilize strategies of conflictual cooperation around training and learning. This must necessarily be situated within the wider political economy.

In the corporate sector, employers have faced few limitations on how they have sought to restructure work, and job insecurity, low pay, and precarious conditions have proliferated. Industrial relations have been increasingly determined by employers, at the same time as union coverage and systems of collective bargaining have declined. Both the context and outcomes of union learning, set against this backdrop, are limited. This does not mean, as Keep et al. (2010) suggest, that union learning activities are necessarily part of the skills rather than the industrial relations agenda. Although policymakers may frame it as such, in a practical sense unions have meaningfully sought to locate new learning activities within the landscape of industrial relations at the workplace; and training is very much (indeed, always) an industrial relations issue. However, unions' ability to make meaningful gains has been constrained, partly, as Keep et al. assert, by the disconnection between industrial relations and skills at the policy level and partly because of the historical decline of the institutional coordination of industrial relations at the sectoral and workplace levels. Significantly, the British state has not sought to initiate new policies for skills upgrading as part of a wider social settlement with

and between the social partners: rather, resourcing for union learning has been set within an environment of unchallenged employer prerogative.

The Industrial Relations of Training in Comparative Perspective: European Developments

Systems of VET across the rest of Europe appear to stand in marked contrast to the UK model. Typically, the industrial relations of training is enmeshed within wider social partnership between the state, employers, and unions, often underpinned by specific legislative provision. In widely referenced cases, such as France and Germany, longstanding institutional arrangements govern the policy, practice, and funding of training provision. For example, the French framework for vocational training evolved from the Grenelle Agreements in 1969 and the resultant 1971 law on training and professional development that set out key principles for the VET system, which have been subsequently enhanced (Le Deist & Winterton, 2012). Key principles include the negotiation of training provision within sectoral structures of collective bargaining, individual rights for employees such as those concerning training leave, and an obligation on employers (with more than 10 employees) to spend a proportion of their wage bill on training (currently, 1.6%). Likewise, the regulation of the German VET system through social partnership and specifically sector-level collective bargaining is enshrined in law, whereas at the company level, the Works Constitution Act "gives works councils formal rights of consultation and codetermination with regard to VET" (Trappmann, 2012, pp. 102–103).

Established legal and institutional frameworks, such as those in France and Germany, are important in shaping how national VET systems respond to evolving challenges and demands. Yet, even highly regulated systems of training provision have come under increasing strain as they attempt to respond to the endemic imperatives of organizational restructuring and an increased demand for labor to be flexible and employable (both within and beyond organizations). This has led, according to Martinez Lucio et al. (2007), to a "new discourse of skills … along with shifts in the way workers are trained and re-trained" (pp. 324–337). Specifically, the direction of travel from a policy perspective has been toward new visions for lifelong learning: "the validation of non-formal and informal learning, and access to learning for workers with low formal skills" (Martinez Lucio et al., 2007, pp. 324–337). As Trappmann (2012) notes, "The changing environment of skill provision means that partnership-based regulation of VET, even in a coordinated market economy such as Germany, is under increasing threat" (p. 118). This is evident more in practice than in policy formation: The revered apprenticeship system has faced increased competition from enrollments in higher education; unions have struggled to influence and institutionalize the policy and practice of continuing VET at the workplace level; and the general strength of unions has weakened, with concessions increasingly made to sectoral agreements at the workplace level.

Such challenges have prompted numerous attempts at reform. In contrast to the UK, where reform tends to mean replacing (with alarming regularity) one set of structures and policies with another, all the while emphasizing employer leadership, in other European countries new initiatives tend to involve the social actors in a more collaborative fashion, building on existing institutional frameworks and culturally accepted approaches of joint working and negotiation. And there is often a closer connection between industrial relations and skills policy formation. Stuart and Wallis (2007) reviewed a number of different reforms across European countries, as social actors sought to respond to the challenges of economic and corporate restructuring. They suggested that in the UK, apart from some limited cases of trade union–led learning partnerships, there was little by way of joint coordination between capital, labor, and the state around training and learning. Across a number of other key European economies, however, they identified numerous high-profile examples of *neocorporatist* and *microcorporatist learning partnerships.* The former tended to include macrolevel social pacts or significant corporate-level initiatives that evolved from existing legal provisions or institutional frameworks, whereas the latter, often supported by the wider sectoral or national frameworks of industrial relations, focused on anticipatory responses to restructuring at the workplace level.

Neocorporatist reforms sought to advance new systems of competence assessment, the accreditation of informal learning of workers at the plant or sector level, or workplace-level learning and development plans, and they included high-profile examples such as the Norwegian Competence Reform (CR) program and the metal sector agreement in Baden-Württemberg. The key objective of microcorporatist learning partnerships was to facilitate change through flexible arrangements of workforce upskilling, with a focus on the development of sector- and firm-specific skills, and often included cases where companies sought to offer pay incentives for new qualifications gained.

The Norwegian CR is a particularly good example of a neocorporatist response, and usefully illustrates the drivers and innovation associated with such reforms, as well as the implementation challenges they face. Driven from the early 1990s by the Norwegian Confederation of Trade Unions—the Landsorganisasjonen (LO)—the rationale for the CR was set against a backdrop of economic uncertainty, rising unemployment, the knowledge economy, future skill needs, the potential of increasing skill disparities to undermine the Norwegian tradition of wage equality, and the inability of unions to leverage high wage demands. Lifelong learning was seen as a viable agenda issue in an industrial relations context of employer demands for wage moderation. From 1994, a new clause was added to the Basic Agreement, negotiated between the LO and the Federation of Norwegian Business and Industry, which "established further and continuing education as a joint responsibility, and required employers to finance further and continuing education in accordance with the needs of employees" (Skule, Stuart, & Nyen, 2002, p. 270). Following this, the LO pushed for wider demands for statutory rights to time off work for learning and an annual entitlement to training time. The LO's vision took some time to be realized, and ruptures arose both between union affiliations and relevant employer bodies, including a number of high-profile strikes around the right to lifelong learning (Teige & Stuart, 2012). Following additional state support, the CR was ratified in 1999. Key provisions

included a statutory right to study leave of up to 3 years after being employed for 2 years, and a series of proposals on the documentation of formal and nonformal skills. Although the CR can be seen as one of the most sophisticated attempts at a negotiated settlement on CR anywhere in the world, its implementation has been at best partial. Key issues include the unresolved question over who funds education leave, the funding of which was rejected by employers, and a generally poor takeup of the CR's provisions on the documentation of skills, at least in part due to poor encouragement by unions. Reflecting on the reforms, Bowman (2005) concluded that the CR "eventually succumbed to a combination of united employer opposition and lukewarm labour support," suggesting that "employment training in cooperative market economies does not always take a cooperative form, and even when it does, cooperation may be an outcome that is more difficult to achieve than is often assumed" (pp. 570, 590).

In summary, in many European countries, there is greater coordination between the social actors around VET than in the UK. This tends to mean that decisions around investment in training provision—be that in terms of quality or quantity—are more likely to be the product of negotiation between the state, employers, and workers' representatives, rather than left to the sole prerogative of management decision making at the workplace level. Systems of training provision are relatively clear and stable, rather than subject to constant reform. Where reforms are considered necessary and new initiatives are developed, they progress within established structures and frameworks. The Norwegian CR can thus be seen as the product of the industrial relations system, an idea motivated by the felt need by unions to respond to changing economic circumstances, but subsequently designed in negotiation with employer bodies and government.

Negotiated change, however, also has to be implemented and responsibility taken for funding—and this often proves to be problematic and contested, even in highly coordinated contexts. The skills agenda is increasingly complex, with more of an emphasis on individual employability (and responsibility), informal learning and tacit skills, and the accreditation of prior learning. Ensuring that all parties' concerns are reconciled and that different actors are responsibly engaged in the implementation process is challenging, to say the least. In addition, although new social pacts around training and learning often emerge out of traditional structures of industrial relations, these very structures are themselves increasingly fragmenting and under threat. Thus, although (following Streeck, 1992) trade unions have sought to collaborate in reforms of training and learning systems on the basis of conflictual cooperation, they have done so in the context of declining membership and weakened leverage on employers. Such reforms have also raised new capacity and resourcing issues that often impede the ability of trade unions to press for implementation at the workplace level.

Conclusions

This chapter has explored the connections between training and development and industrial relations. As the skills agenda has moved increasingly to center-stage on policy agendas, training and development issues have become more of an industrial relations concern. Faced with the complexities of the new skills and

learning agendas, policymakers are keen to extol the social actors to cooperate and build partnership relations to help address the challenges of building more productive economies. For industrial relations commentators, this is often conceptualized as a new supply-side approach whereby representatives of capital and labor work together, in partnership, to advance new initiatives around training, learning, and skills for the benefit of all. Simplistically, training and development are seen to represent a noncontentious basis for a new workplace politics around which social actors can build mutual gains strategies. Trade unions too are also encouraged to situate training and development as part of new innovative strategies of representation.

There is, of course, a strong logic to the argument for industrial relations cooperation around training and development. Comparative evidence has consistently highlighted that those economies with strong coordinated relations and institutions between the social actors concerning skills tend to outperform those that have less of a tradition of social partnership or where employers have prime responsibility for training investment decisions, such as in the UK. Institutional legacies also prove helpful in framing new responses, as can be seen from the various macrolevel initiatives around lifelong learning in countries like Norway.

However, the success of such initiatives, even in highly coordinated economies, is not predetermined. A number of challenges are evident. First, although training, learning, and skills are often presented by policymakers as benign public goods, the reality in terms of workplace implementation is very different. Differences of interest between employers, unions, and workers over access to training, the funding of training, the purpose of training, the rewards and benefits of training, and how training acquired at the workplace is utilized are all possible points of contention. This can be seen as one dimension of the industrial relations of training, as training practice is inherently an industrial relations issue because the social actors have different interests over investment, acquisition, and utilization. The second dimension is institutional. Institutions—such as collective bargaining and sector-level agreements—around training exist to reconcile the potential conflicts of interest that may arise around training and development. To be effective, according to Streeck (1992), such institutions need a dynamic of conflictual cooperation, in recognition of the fact that training and development are potentially contentious investment goods. This dimension was seen to be entirely absent from the UK's market-based approach. Here, innovation in the industrial relations of training has been around trade union–led learning, which, although highly effective for those benefiting from it, can be seen to be rather small-scale and piecemeal. The longstanding weaknesses of the UK training system have not been addressed.

Given the limitations of the UK training system, it is no surprise that commentators often look highly favorably at the institutional dynamics of industrial relations within more highly coordinated economies. But it is increasingly important to recognize that the new agenda of skills (with its emphasis on employability, lifelong learning, accreditation of informal learning, etc.), situated within an increasingly uncertain economic and corporate landscape—where continuous organizational restructuring and flexible labor markets hold sway—makes even highly negotiated sectoral agreements in coordinated economies difficult to implement effectively at the workplace level. Although social partnership still

plays an important role in shaping new collaborative initiatives and policies around training, learning, and skills, implementation is often a challenge. The industrial relations of training is not, therefore, a simple technical matter or the product of a new consensus; it is an increasingly contested arena within the changing context of the new politics of work.

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10

Measuring Performance in Vocational Education and Training and the Employer's Decision to Invest in Workplace Training

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Introduction

The provision of workplace vocational education and training (VET) varies strongly across countries. Some types of VET that require a high level of commitment from firms, such as dual apprenticeship training where training takes place both at the workplace and in vocational schools, are of great importance in countries such as Germany, Switzerland, and Austria. However, in many other countries with significant VET systems (such as Denmark or the Netherlands), VET requires a relatively low financial investment by firms (OECD, 2011). Although VET students may spend some time in firms during work placements, the financial investment in skills is borne by the public, either by means of training subsidies that reimburse firms for their expenditure, or because most of the skills are provided in publicly funded vocational schools. Measuring performance in apprenticeship training (in terms of training benefits minus training costs) has not been a major issue for businesses, because in most countries they have not had to make significant investments in the first place. However, many companies make significant investments in continuing VET. Although training expenditures, particularly course costs, are straightforward to measure, estimating the returns on such investments, in terms of increased productivity, innovation, or a reduced fluctuation rate, is more involved because access to training programs may be restricted, with training targeted at low or high performers, for example. In addition, outcome variables may be difficult to measure or may be affected by other factors over time, such as the business cycle. As a result, simple before-and-after comparisons, or analyses of cross-sectional differences in outcomes among participants and nonparticipants, provide very limited insights.

Nevertheless, generating knowledge about the costs and benefits related to workplace training programs is important. Human resource (HR) management

departments are under increasing pressure to provide empirical evidence that shows how different HR activities, such as training and development programs, add value to the firm. Empirical research is still limited with regard to the return on training investment at the organizational level (Aguinis & Kraiger, 2009; Wolter & Ryan, 2011). However, where workplace training is seen to be of strategic importance to a business, it is important to be able to measure both the costs and benefits related to such programs.

From a policy perspective, knowledge about the performance of workplace training is equally important. Recent policy initiatives have attempted to increase VET provision in the workplace. In particular, small and medium-sized businesses have been encouraged to offer training positions and to focus on the business case for providing workplace VET, in order to convince firms that short-term costs from offering training are balanced by both short- and long-term benefits (Helper, Noonan, Nicholson, & Landon, 2016). For such initiatives to succeed, however, solid empirical knowledge about the expected costs and benefits of offering apprenticeship training is important.

The aim of this chapter is to discuss the relevant theoretical background as to why the costs and benefits of providing workplace VET are important determinants of a firm's willingness to engage in workplace training. In addition, I discuss different approaches that have been followed in the literature to measure VET performance, its determinants, and how it impacts a firm's training behavior. The next section discusses why employers invest in training. The "Measuring the Performance of Workplace Training" section discusses different approaches to measuring VET performance in the workplace. The "How Firms Can Moderate the Performance Effects of Workplace Training" section investigates the factors that firms can influence to generate a favorable return on their training investment. The final section provides conclusions.

Why Employers Invest in Training

A firm's need to invest in training employees depends on the discrepancy between skill requirements, the actual skills of current employees, and the skills of workers who are available on the external labor market. When there are viable options for, first, training employees in the workplace (or for training unskilled workers from the external labor market), or, second, for hiring workers who already possess the required skills, the training decision will depend on the relative costs of each option (Blatter, Muehlemann, Schenker, & Wolter, 2016; Stevens, 1994).

Providing workplace training is costly, as a firm has to design a training program, use external instructors or internal staff to instruct trainees, and pay for any equipment that will be used exclusively for training purposes. However, it may also be expensive to find workers in the external labor market who meet all skill requirements. Although businesses have to invest in the search process to identify suitable candidates and to conduct and evaluate interviews, production may also be disrupted during the time that a new recruit adapts to the new job, resulting in financial losses to the company (Muehlemann & Strupler Leiser, 2018).

In a completely competitive labor market, and when all skills are general and thus useful for many different firms, workers will always be paid the value of their productivity output or marginal product (Becker, 1962). In such a case, businesses would be unwilling to invest in general training, and any investment would have to be made by workers. In this scenario, therefore, a firm's primary motive to offer training would be to substitute trainees for other employees, rather than to make an investment in trainees with the goal of retaining them as skilled workers (Lindley, 1975). Workers can reap future benefits by investing in their own human capital because they will be paid a wage according to their productivity (which increases due to training). This means that an efficient level of training investment can be achieved in equilibrium between workers and employers.

In reality, however, there are important frictions in labor markets (Manning, 2011). First, it takes time for a firm to find suitable job candidates. In Germany, for example, the duration of the search process from the start to the hiring decision was 52 days on average in 2012 (Brenzel et al., 2013). Between the hiring decision and the first day of work, another 29 days pass, so that the total from initiating the search process to the first day of work of the new recruit averages just over 80 days. Even though firms can plan to fill vacancies and typically start the search process while the vacancy is still filled (in the case of employee replacements), empirical results show that the difference between the desired and the actual starting date was on average 25 days. Thus, it becomes clear that firms cannot immediately fill vacancies, and may not be able to fill vacancies as quickly as they desire. Second, the search process is costly for both firms and individuals. From a firm's perspective, the costs to successfully fill a vacancy typically increase by firm size and differ by industry and occupation (Blatter, Muehlemann, & Schenker, 2012; Muehlemann & Pfeifer, 2016). These figures, however, do not include potential costs due to unfilled vacancies. Data on direct hiring costs are available for only a few countries, such as France, Switzerland, and the USA (Manning, 2011).

Thus, even in the extreme case where all the skills required to perform a job are completely general, labor market search costs suggest that firms may still be willing to invest in general training to save future search costs (Merrilees, 1983; Stevens, 1994). Conversely, mobility costs and information asymmetries for individuals suggest that they would not be able to reap all the benefits from their own investment in general human capital. As there are costs associated with mobility and because searching for outside job offers is costly for the individual, employees do not immediately quit their jobs when they are paid less than the value of their marginal product. As a result, firms have a degree of monopsony power over their employees, enabling them to offer wages below the value of their marginal product. Differences between productivity and wages increase with the level of general training, leading to wage structure compression (meaning that new employees are paid more than existing employees). As a result, firms have an incentive to invest in general training in order to maximize profits (Acemoglu & Pischke, 1998, 1999; for a detailed review of training literature that addresses the role of frictions in the labor market, see Leuven, 2005).

Where skill requirements for a particular job include a significant fraction of firm-specific skills, a firm will have an additional incentive to invest in training. Although firm-specific human capital will increase the productivity of workers in the current firm, it will not be useful (and thus not remunerated) in other firms. For that reason, both employees and firms have an incentive to renegotiate wages after completing training (the *hold-up problem*). Where workers pay for specific training, the firm should have an incentive to offer a post-training wage that is equal to the value of the worker's general human capital (the outside option). Conversely, where a firm pays for all firm-specific training, workers have no incentive to remain with the firm, unless the firm increases wages above the value of the worker's general human capital. Therefore, investments in firm-specific human capital tend to be borne by both the worker and the firm, although both parties share the benefits that arise after training (Becker, 1962; Hashimoto, 1981). When firm-specific human capital is important, hiring from the external labor market becomes more expensive. Empirical evidence for skilled worker vacancies in Germany and Switzerland shows that adaptation costs for externally hired workers, which largely correspond to firm-specific human capital, exceed search costs by a multiple of 4–12, depending on firm size (Muehlemann & Pfeifer, 2016; Muehlemann & Strupler Leiser, 2018). Kessler and Lülfesmann (2006) show that an interaction exists between providing general and firm-specific training: Firms that provide general training have an incentive to invest in specific skills, and vice versa.

To sum up, firms need to provide workers with the required general and firm-specific skills so that they can successfully perform the various tasks demanded by their jobs. As long as all skills are general, and labor markets are perfectly competitive, workers will pay for training in general skills. Conversely, both firms and workers are willing to finance a certain percentage of firm-specific human capital, and share the benefits accordingly. In frictional labor markets, however, firms also have an incentive to finance general human capital.

To put theoretical models about human capital investments to the test, it is necessary to obtain a valid measure for worker productivity. Although worker productivity is equal to the wages in competitive labor markets, there are few doubts that frictions exist. These frictions include search costs, workers' mobility costs, and asymmetric information about the ability of workers between employers or unions. The result is wages that are below the value of marginal worker productivity. Thus, even though they are correlated with productivity, wages may be a poor predictor of changes in productivity due to workplace training. Although inferring the wage effects of training is important from an individual's perspective (i.e., wage increases due to training largely determine the rate of return to training), obtaining a valid productivity measure is crucial both for determining the rate of return on the firm's training investment and for any empirical test of the theoretical predictions of human capital models, which explicitly address frictions in the labor market (Acemoglu & Pischke, 1998; Stevens, 1994).

The next section discusses measurement issues regarding the identification of productivity effects from workplace training. I then discuss the role of the firm and the firm's environment, respectively, in moderating the corresponding training-related performance effects.

Measuring the Performance of Workplace Training

The productivity effects of workplace training can be measured at both the individual and firm levels. From an individual's perspective, wage effects are more important than productivity effects when labor markets are imperfect, as the rate of return on workplace training depends mainly on higher future wages, although higher job satisfaction and a lower risk of future unemployment (Hanushek, Schwerdt, Woessmann, & Zhang, 2016) are also important. At the individual level, we would like to measure the productivity increase that arises on completing a particular workplace training program. Company-wide training efforts, such as running apprenticeship training programs, should be analyzed at the company level. Finally, from a policy perspective, we measure aggregate effects at the industry, state, or national level.

Identifying the productivity effects of workplace training is a rather difficult task. From an economic perspective, a valid and reliable measure of productivity is highly desirable. For some tasks, individual worker productivity measures can be obtained in a relatively straightforward fashion. Examples of productivity measures used in the economic research literature include the number of windshields that a worker repairs each day (Lazear, 2000), how many kilos of fruits are picked by agricultural workers (Bandiera, Barankay, & Rasul, 2010), how many items a supermarket cashier scans in a given time period (Mas & Moretti, 2009), or the frequency and duration of calls from call agents (De Grip & Sauermann, 2012; see also Sauermann [2016] for a review on productivity measures used in the economic literature). However, quality aspects should also be included in productivity measures. De Grip and Sauermann (2012), for example, use the share of "call-backs" in call centers to adjust for the quality of phone calls. In terms of production workers, a common measure is the defection rate (i.e., the share of produced units that are defective and thus cannot be sold to customers) (Sauermann, 2016).

Performance measures should not depend on factors that are outside a worker's control (e.g., changes in product demand, seasonal factors, etc.), as this would make it difficult to isolate the causal effects of training. With regard to workplace training, we are interested in the causal effect of training on productivity. However, a simple before-and-after comparison may not identify the causal effects of the training program if other (unobserved) factors that affect performance also change over time. In addition, firms do not always have appropriate productivity measures available, or they are unable to make them available at a reasonable cost. Typically, some tasks carried out by workers are easier to measure than others, and certain tasks may need to be carried out more carefully than others (e.g., where mistakes are very costly to the firm). Accordingly, where a firm uses performance measures (and rewards performance) only for selected tasks, worker effort will be distorted, which limits the productivity effects of training measures for tasks that are not incentivized.

Directly measuring productivity at the individual level is, therefore, very context specific, and it is difficult to obtain a productivity measure that allows a comparison of worker productivity across firms and across occupations.

However, when taking a policy perspective with regard to workplace training, this is exactly the type of measure that would prove most useful.

Measuring the performance of workplace training is important for at least two reasons. First, we need to observe performance to determine the effectiveness of training (i.e., whether training improves an employee's skills). The most optimal training design may not be clear *ex ante*. Thus, for a firm to find out the best way to deliver training, performance measures are required to compare the outcomes when using different training methods (e.g., switching from traditional instruction to more technology-based training methods). Second, measuring performance is necessary if a firm wants to assess the efficiency of a training program. Training costs are often easier to measure, but without a performance measure, a firm cannot calculate the return on its training investment. However, where workplace training is of strategic importance to the firm, providing evidence for its effectiveness and efficiency is crucial.

Using Added Value as a Measure of VET Performance

In the absence of a suitable and generalizable individual-level productivity measure, alternative measures need to be taken into account. One strategy is to use firm revenue as a measure for worker productivity. Dearden, Reed, and Van Reenen (2006) estimated the wage and productivity effects of training in the UK using an industry panel from 1983 to 1996. They analyzed the association between changes in training, changes in wages, and added value at the industry level, using a generalized method of moments (GMM) estimator to account for the potential endogeneity of training. They reported that an increase of 1% in the proportion of employees trained was associated with a 0.6% increase in productivity and a 0.3% increase in wages, implying that workers were paid less than their marginal product. Zwick (2006) used a similar approach, but at the firm level, assessing the positive productivity effects of training participation in Germany. He reported that an increase of 1% in the share of trained employees increased average added value by about 0.7% in the subsequent 3-year period.

Using a similar approach with German firm-level panel data, Mohrenweiser and Zwick (2009) analyzed how increasing the share of apprentices compared to unskilled workers increased marginal gross profits, as measured by the difference between added value and wage costs. They reported positive effects on gross profits in some occupations (trade, commerce, craftwork, and construction) but negative effects in others, such as manufacturing. A main advantage of such data is the ability to analyze a firm's training behavior over time, while controlling for unobservable characteristics that do not change over time. A drawback, however, is the lack of training-specific indicators (training is seen as a black box). Examples include training hours in the workplace or the allocation of tasks to apprentices, which would allow both firms and policy makers to identify key factors that determine both the costs and the benefits of training. Economic theory suggests that firms invest up to the point where the marginal return on training is equal to the marginal benefit of training, yielding zero marginal profit from training in equilibrium. However, because marginal training costs and benefits are unlikely to be independent of the number of trainees, knowledge

about total (or average) profits from training also matters, particularly from a policy perspective (e.g., whether subsidy programs increase training provision). Muehlemann (2016) discusses the implication of the functional form of training costs and benefits in detail.

More recently, Konings and Vanormelingen (2015) have estimated the effect of training on revenue and wages in Belgian firms, including information on training costs and training hours. They were able to identify marginal performance and marginal wage effects resulting from the provision of an hour of workplace training, making their approach a promising avenue for measuring the performance effects of workplace training. However, the data requirements are high, and I am not aware of other countries besides Belgium that currently have similar datasets. The general findings of Konings and Vanormelingen (2015) are that the marginal effect of an hour of training on productivity is higher than the marginal effect on wages, as suggested by the recent training literature. Most of the training analyzed in the underlying data was rather short in terms of training duration, averaging 39.1 hours and costing EUR 1414 per worker. However, depending on the type of workplace training, applying such an estimation technique may be difficult. For example, dual apprenticeship training lasts between 2 and 4 years. This is the most important type of workplace training in Germany and Switzerland, Austria, Denmark, and the Netherlands and is also becoming increasingly important in the UK (Fuller, 2016), and it is gaining increased attention in the USA (e.g., Helper et al., 2016). We would also expect the difference between productivity and wages to be more pronounced where training is not certified (such as upgrade training) and where it includes more firm-specific components, which are not valued on the external labor market (as predicted by Becker, 1962; see also Lewis, 2014).

Although the production function approach is appealing in many respects, it has a number of limitations when it comes to measuring performance from apprenticeship training programs. In particular, it may be difficult to analyze training in small firms, where the frequency of training is low. In small firms, it is quite common to train one apprentice at a time and to only hire a new apprentice once the former has graduated successfully. Thus, the number of trainees remains constant, so that no variation in training can be observed over time. Partly for that reason, Mohrenweiser and Zwick (2009) only consider enterprises with 20 or more employees. However, in Germany, more than 70% of all training firms have fewer than 20 employees (BIBB, 2016), and it should be noted that Konings and Vanormelingen (2015) do not report sample restrictions in terms of how many small firms were excluded from their estimation sample. Thus, using a production function approach at the firm level generally tends to limit the analysis of workplace training to larger firms. As a result, generalizing results to the population of all firms becomes difficult. Looking at large firms may be of considerable interest too, of course. However, in the case of apprenticeship training programs, measuring performance in smaller firms is of particular interest from a policy perspective. As recent political initiatives aimed at encouraging firms to participate in workplace training are often targeted at small firms, knowledge about the performance of VET programs in small firms is desirable.

Using Cost–Benefit Surveys to Measure VET Performance

Cost–benefit surveys on apprenticeship training in Germany, Switzerland, and Austria offer another way to measure performance, which avoids some of these issues (Jansen, Pfeifer, Schönfeld, & Wenzelmann, 2015; Schlögl & Mayerl, 2016; Strupler & Wolter, 2012). In these surveys, information about training is obtained by training occupation, and also for each year of training. As apprenticeship training lasts from 2 to 4 years, it is also of interest for both firms and policymakers to have information about the development of trainee performance during training, and within particular occupations. As measuring absolute productivity is difficult in cross-sectional surveys that include training in many different occupations, cost–benefit studies use a measure of relative productivity. In particular, individuals in charge of workplace training were asked to report the relative productivity of apprentices in skilled tasks compared to that of an average skilled worker in the same occupation (in the same firm). Such subjective productivity measures are likely to include measurement error; however, no systematic bias in measuring average productivity arises as long as individuals responding to the survey provide a best estimate, given their information set (Hyslop & Imbens, 2001).

Although this measure does not allow us to calculate the level of an apprentice's productivity (in terms of production units), it is a measure of a firm's monetary benefit from having an apprentice carry out skilled tasks in comparison to having a regular skilled worker carry out the very same task. For example, if the relative productivity of an apprentice is 50%, having an apprentice work for 2 hours is supposed to yield the same outcome compared to having a skilled worker carry out one hour of skilled work. Thus, in this example, the monetary benefits to the firm comprise the corresponding savings in labor costs from not having to assign that particular task to a skilled worker. Whether or not using an apprentice is more profitable than using a skilled worker depends on the training costs and on the training wage—variables that are also observed in cost–benefit surveys.

Although training wages are typically easy to account for, calculating training costs is somewhat more involved. In the case of workplace training, firms often use part-time instructors (i.e., skilled workers who have completed a VET instructor course). Thus, part-time instructors may only instruct apprentices for part of the time during the day, and may carry out their regular tasks for the remaining time. However, even when instructing apprentices, instructors may still be able to perform productive work, for example when apprentices are simply observing how to carry out a certain task. In addition, part-time instructors may provide training during slack times. Thus, not all the time that an instructor spends with an apprentice is costly for the firm. For that reason, only the time that part-time instructors are unable to pursue regular work is relevant for the calculation of training costs. A similar approach was also applied in the UK (Gambin, Hasluck, & Hogarth, 2010) and Australia (Dockery, 1997), although both studies rely on smaller sample sizes with non-representative data for the corresponding countries.

Table 10.1 summarizes the main components of a firm's training costs and benefits. The main cost components are labor costs for apprentices, labor costs for

Table 10.1 Costs and Benefits of Apprenticeship Training From the Firm's Perspective.

Training costs				Training benefits	
Labor costs for apprentices	Labor costs for instructors	Costs for material and infrastructure	Other costs	Short-term training benefits (during training)	Long-term training benefits (after training)
Apprentice pay	Full-time instructors' pay	Expenses for workstation used for nonproductive activities (e.g., machines, computers, tools, and exercise equipment)	Learning and teaching material (e.g., software, books), working equipment, protective clothing, etc.	Benefits from unskilled tasks	Savings on future hiring costs for skilled workers
Irregular wage payments (bonus, performance pay, 13th/14th monthly salary, etc.)	Part-time instructors' pay	Training center	External training courses, training-related fees to professional associations, training funds, etc.	Benefits from skilled tasks (adjusted by relative productivity)	Shorter vacancy duration
Other employer contributions (e.g., according to tariff agreements in Germany, reimbursement for travel costs, food, or living expenditures)	External instructors' fees	Within-firm formal training courses (away from the workplace in separate classrooms)	Administrative and recruitment costs for apprentices		Better match quality, lower turnover rate, and lower firing costs
					Compressed wage structures

instructors, costs for material and infrastructure, as well as other costs such as examination fees, course material, the recruitment of apprentices, and corresponding administrative tasks. Apprentices yield a direct benefit to the training firm during training, as they perform both skilled and unskilled work. Their productivity in skilled tasks, however, is clearly limited early on, and is therefore adjusted by the relative productivity measure.

Tables 10.2–10.4 show the average costs and benefits from offering apprenticeship training, based on the latest cost–benefit surveys in Germany, Switzerland, and Austria. Although apprenticeship training is profitable on average in Switzerland for both 3- and 4-year apprenticeships, net costs are highest in Germany, with positive net costs in each year of training. Austria lies between the two countries in terms of VET performance. Empirical estimates of

Table 10.2 Average Costs and Benefits of Apprenticeship Training per Apprentice in Germany, by Duration and Training Year (in EUR), 2012–2013.

Duration		1st year	2nd year	3rd year	4th year
2 years	Costs	15,823	17,713		
	Benefits	10,561	12,358		
	Net costs	5,262	5,355		
3 years	Costs	16,827	17,686	18,528	
	Benefits	11,367	13,757	16,564	
	Net costs	5,460	3,928	1,964	
3.5 years	Costs	19,612	19,742	20,528	12,700
	Benefits	6,866	9,636	13,139	7,594
	Net costs	12,746	10,105	7,389	5,106

Source: Adapted from Jansen, Pfeifer, et al. (2015).

Table 10.3 Average Costs and Benefits of Apprenticeship Training per Apprentice in Switzerland, by Duration and Training Year (in EUR), 2009.

Duration		1st year	2nd year	3rd year	4th year
3 years	Costs	24,605	24,876	29,077	
	Benefits	24,425	27,848	34,207	
	Net costs	182	−2,972	−5,130	
4 years	Costs	24,523	24,528	26,881	29,223
	Benefits	19,486	23,369	30,482	39,442
	Net costs	5,036	1,159	−3,601	−10,219

Note: CHF/EUR exchange rate of 1.10.
Source: Adapted from Strupler and Wolter (2012).

Table 10.4 Average Costs and Benefits of Apprenticeship Training per Apprentice in Austria, by Training Year (in EUR), 2016.

	1st year	2nd year	3rd year	4th year
Costs	19,739	22,274	26,528	17,164
Benefits	17,130	19,142	22,010	13,128
Net costs	2,609	2,132	4,518	4,036

Note: Figures represent all firms offering apprenticeships in columns 3–5, but only firms offering training in occupations with a duration of 3.5 years in the fifth column. Data by training duration are not available.
Source: Adapted from Schlögl and Mayerl (2016).

net training costs with regard to a firm's demand for apprentices show that VET performance can help explain a firm's training behavior. Wolter, Muehlemann, and Schweri (2006) show that although training firms in Switzerland generate a positive return on investment on average, expected net costs for nontraining firms are substantial. Thus, those firms that actually engage in apprenticeship training differ from nontraining firms in terms of both observed and unobserved characteristics. Muehlemann, Schweri, Winkelmann, and Wolter (2007) found that an increase in the net costs of apprenticeship training negatively affects a firm's demand for apprentices.

There are a number of possible channels through which a firm can generate additional benefits after the completion of training, as outlined in the last column in Table 10.1. First, a firm may want to retain an apprentice as a skilled worker and therefore save on hiring costs for external recruits. Based on data from the cost–benefit surveys, Blatter et al. (2016) show that Swiss firms facing high external hiring costs (relative to net training costs) have a higher demand for apprentices. Former apprentices may also be a better match in terms of their organizational fit, as the firm has the opportunity to screen an apprentice for a period of 2 to 4 years. Thus, it can be expected that informational asymmetries regarding important personality traits, and general ability and skills, can be greatly reduced in comparison to hiring from the external labor market (Lange, 2007). For these reasons, the fluctuation rate of former apprentices may be lower compared to hiring externally, but the probability that a worker will be laid off also decreases, resulting in lower future firing costs. These can be significantly high, depending on labor market institutions. As training-related productivity increases are not fully compensated in terms of wage increases (Acemoglu & Pischke, 1999), firms can generate a cost benefit from training.

As firms can only reap post-training benefits when apprentices remain with the firm after training, we need to observe the tenure of former apprentices in order to estimate such post-training benefits. Measures on average post-training tenure for apprenticeship graduates are available in cost–benefit surveys, allowing us to assess post-training benefits. Information about individual tenure and the post-training wages of individual apprentices can be seen in linked

employer–employee data (Fitzenberger, Licklederer, & Zwiener, 2015; Göggel & Zwick, 2012). More recently, data from cost–benefit surveys have been matched with linked employer–employee data in Germany, thereby opening up new research opportunities by linking cross-sectional data on training costs and benefits with longitudinal information about both training firms and apprentices (Dietrich et al., 2014).

Finally, there are a number of other indicators that may be appropriate when analyzing the potential benefits of workplace training. Bauernschuster, Falck, and Heblich (2009) found that German firms, which offer continuing workplace training, increase future innovation rates. Dostie (2014) shows that Canadian firms providing workplace training also increase innovation rates. With regard to dual-apprenticeship training, similar effects arise, as shown by Rupietta and Backes-Gellner (2015). Thus, these studies show that training benefits may arise in the long term, as new innovations typically take some time to translate into higher profits.

How Firms Can Moderate the Performance Effects of Workplace Training

A firm can significantly influence the productivity effects of workplace training by ensuring the proper design, implementation, and evaluation of training programs. A needs analysis helps to determine what individual competencies need to be improved by means of workplace training, and whether training itself is actually the best solution to the corresponding issues (Noe, 2016). However, little data are so far available (beyond case study evidence) with regard to how firms organize training, how they monitor the quality of the training process, and the extent to which instructor competencies affect the outcome of workplace training. Other factors, such as the selection of trainees and the impact of input quality on training investments, have received some attention in the literature. Finally, as wages can be adjusted during the training period, it is possible to share the training investment between firms and employees without having to rely on post-training benefits.

Input Quality of Trainees and How Firms Can Address Demographic Change

High-ability trainees are more likely to succeed in training, require less supervision, and are more likely to graduate compared with low-ability trainees. Muehlemann, Braendli, and Wolter (2013) analyze input heterogeneity in terms of trainee quality and how firms then adjust their training strategies. They provide evidence from Swiss apprenticeship data that training firms invest in additional instruction time for apprentices with below-average grades in compulsory schooling, but only in training occupations that are profitable on average. In contrast, firms focus most of their resources on the most able apprentices in training occupations that typically involve a net investment from the perspective of the firm. With regard to cognitive skills, Jansen and Pfeifer

(2017) show that, in Germany, school competencies are important and are associated with future performance in skilled tasks during apprenticeship training. However, they only find significant effects for commercial training occupations, with no effects for technical or craftwork occupations.

Demographic changes in many Western countries (fewer young people entering the labor market while an increasing share of the older workforce retires) also impact a firm's workplace training strategy. As competition for skilled workers on the external labor market increases (making hiring costlier), firms may opt for training younger individuals in the workplace. However, as competition for suitable trainees also increases, we would expect that firms will need to invest more in the recruitment process to achieve a given match quality. Recent evidence, based on German cost–benefit surveys, shows a significant association between local competition and recruitment expenses among training firms. However, total recruitment expenses for apprentices are low and only account for 1–2% of total training expenditure (Wenzelmann, Muehlemann, & Pfeifer, 2017). Firms have not made significant increases to their overall spending on the recruitment process in response to the substantial decline of school leavers between 2007 and 2012–2013. Instead, many training firms (particularly small ones) have withdrawn from the apprenticeship market.

Firms may opt to focus their training efforts on older employees at times when it is difficult to find suitable trainees. Empirical evidence, however, shows that firms are providing significantly less training to older employees. Göbel and Zwick (2013) analyzed the effects of specific human resource measures (and their appropriate implementation) on the productivity of older employees. They found positive productivity effects for older workers in firms with age-specific work requirements and specific equipment for older employees, as well as mixed-age teams (which also benefit younger workers). Based on linked employer–employee data, Zwick (2015) shows that firms are allocating the wrong training contents and forms for older employees, leading to a decrease in training motivation and a lower actual training participation rate. Thus, as skilled worker shortages on the labor markets increase in the future, firms may be forced to reconsider spending more resources on finding suitable trainees, focus more of their training efforts on older employees, or both.

Organizing Workplace Training

In apprenticeship training programs, firms typically have some discretion regarding the assignment of productive and nonproductive tasks to apprentices. In particular, a firm may want to provide the relevant skills in an environment away from the firm's production process. Alternatively, a firm may want to provide the corresponding skills primarily on the job. From a theoretical perspective, it remains unclear which of these two approaches is more beneficial for the learning process. To some degree, the choice depends on the type of training (e.g., whether mistakes made by trainees are very costly or may endanger others). Dionisius et al. (2009) show that there can be substantial differences regarding the allocation of productive and nonproductive tasks in apprenticeships, even when comparing similar training occupations across two countries with a

similar education system (such as Germany and Switzerland). The results show that Swiss firms make significantly more productive use of their apprentices compared to German firms, although there are no differences in the relative productivity of apprentices by the end of training. Apprentices were also comparable in terms of their input quality, as the relative productivity in skilled tasks was almost identical in the first year of training (Dionisius et al., 2009).

Thus, the allocation of productive tasks explains a large part of the observed difference in net training costs between Germany and Switzerland. Jansen, Leiser, Wenzelmann, and Wolter (2015) also show that the allocation of productive tasks is related to the institutional environment, as German firms have started to use apprentices for more productive tasks following the Hartz reforms to the labor market. They argue that training firms needed to recoup a higher fraction of their training investment during the training process due to a drop in expected post-training benefits since the labor market reforms took place.

Trainee Pay

Another important parameter that strongly affects a firm's return on investment is trainee pay. Depending on the type of VET provided, wages are subject to a training contract that ends after training. Alternatively, wages are given via an existing employment contract (for existing employees). Apprentice pay is typically only a fraction of a skilled worker's pay (Brunello, 2009). This makes it easier for a firm to recoup training expenditures quickly, and provides incentives to invest more resources in the workplace. However, when trainee pay is high (e.g., equal to unskilled pay, minimum wage, or skilled worker pay), firms are likely to incur net costs by the end of training. In this case, post-training benefits are a necessary incentive for firms to offer and finance workplace training.

In competitive markets, trainee pay is expected to be adjusted so that firms train apprentices up to the point where the expected profits from hiring an additional apprentice are zero (Acemoglu & Pischke, 1998). In Switzerland, for example, apprentice pay is set at the firm level, even though employer associations provide (nonbinding) pay recommendations. Empirical evidence suggests that local competition in the training market is important because competition measured in terms of a shortage of employers in the local industry has a significant association with trainee pay (Muehlemann, Ryan, & Wolter, 2013). Thus, firms with few competitors in the local labor market are able to offer lower apprentice pay, thereby positively affecting their return on training investment. As a result, firms are more likely to offer training in regions with a low labor market density (Brunello & De Paola, 2008; Brunello & Gambarotto, 2007; Harhoff & Kane, 1997; Muehlemann & Wolter, 2011). By contrast, in Germany, where unions have a stronger influence on the wage-bargaining process, relative apprentice pay is higher compared to in Switzerland (Ryan, Backes-Gellner, Teuber, & Wagner, 2013).

Muehlemann and Wolter (2017) show that wages are an important factor in enabling the large-scale introduction of a dual apprenticeship system in Spain. At current minimum pay, it would not be possible to reach the break-even point for Spanish firms. Schlögl and Mayerl (2016) also point out that, compared with

Switzerland, trainee pay is considerably higher in Austria and thus an important determinant as to why net costs are higher in Austria compared to Switzerland. The extent to which a firm can influence trainee pay is one of the most important determinants for achieving a positive return on training investment.

There are also a number of important exogenous factors that affect VET performance, and thus the training behavior of firms. Most importantly, training regulations such as training duration (Malcomson, McGaw, & McCormick, 2003), the curriculum, the relative importance of general skills (Jansen et al., 2016) and training standards at the workplace, certification, and external monitoring affect the quality of the training provided at the workplace (Acemoglu & Pischke, 2000; Dustmann & Schönberg, 2012), and the subsequent value of such training for individuals on the external labor market. Institutions, such as unions or works councils, can positively affect both trainee pay and post-training benefits (Dustmann & Schönberg, 2009; Kriechel, Muehlemann, Pfeifer, & Schuette, 2014). For a more detailed discussion of how external factors affect VET performance and thus a firm's training provision, see Muehlemann (2016) and Chapter 9 in this volume.

Conclusions

Measuring VET performance has received growing attention in the economic literature in recent years. Although there are a number of potential benefits related to the provision of workplace VET for individuals, firms, and society as a whole, measuring the magnitude of the associated costs and benefits, and any causal effects of their determinants and consequences, remains a challenging task. Recent empirical evidence confirms the predictions of human capital theory. In countries with a more flexible labor market, such as Switzerland, firms are willing to provide high-quality training as long as most of the investment in VET is borne by trainees accepting a low training wage. As a result, a firm's training costs are covered by the difference between a trainee's productivity and the training wage. Conversely, in countries with more rigid labor markets, such as Germany, the predictions of the new training literature have been confirmed insofar as training firms are willing to make a substantial net investment in general skills because they can expect sufficiently high post-training benefits. Several studies that use different empirical approaches conclude that productivity increases due to workplace training exceed corresponding wage increases. Businesses that invest in training can therefore capture at least part of the training-related productivity increase to cover their initial training expenses. Nonetheless, evidence-based knowledge about the most effective and most efficient ways for businesses to provide high-quality VET at the workplace is still limited.

However, the emergence of longitudinal data about both individuals and firms in a number of countries is a promising avenue to improve methods of measuring VET performance, and to better understand the determinants and effects of important training outcomes, such as future wages, job satisfaction, unemployment risks, and career opportunities. Taking a dynamic perspective is particularly

important for measuring the effects of continuing VET with the aim to develop and prepare employees for future tasks, rather than improving their performance at the current job. In such a context, solely measuring the short-term training benefits fails to capture the full effects of continuing VET and consequently underestimate a firm's return on investment. Thus, it is important to account for individual characteristics of the trainees and the heterogeneity in the type of continuing VET programs, rather than relying on simple binary information about whether a firm offers continuing VET or not. Initial VET programs, such as dual apprenticeship training in Germany, Austria, or Switzerland, follow a standardized training curriculum that requires firms to train apprentices in a number of occupation-specific skills at the workplace. However, the design of continuing VET programs depends to a much larger extent on a firm's business strategy and the organization of work and production processes. Although a cost–benefit analysis is typically feasible for individual firms, outside researchers often do not have access to such data. Thus, large-scale datasets are necessary to make evidence-based policy decisions, including providing financial incentives for training firms. In the absence of such data, it remains difficult to assess both the effectiveness and efficiency of policy interventions with the aim to promote continuous VET at the workplace.

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11

Excluded Within the Inclusive Institution: The Case of Low-Skilled, Low-Wage Security Employees

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Introduction

This chapter examines vocational education and training (VET) in the context of low-skilled, low-wage employees in the private security industry in Singapore. It challenges the rhetoric of inclusiveness as expressed in Singapore's national skills strategy, which aims to empower all individuals to pursue skills mastery in order to pursue their career aspirations. In doing so, the chapter provides a critique of Singapore's concept of the developmental state and its approach to welfare capitalism. The chapter recommends the need for policy intervention to move beyond a focus on skills supply in order to confront structural problems in the labor market and workplace. It draws attention to the challenges all governments face in making continuing education and training (CET) accessible for adults through the lifecourse (see also Chapter 23, this volume).

Despite being a relatively young nation, Singapore has attained the status of an advanced economy within a mere 50 years (Economist, 2015). Statistics from the Ministry of Manpower show that the unemployment rate of the resident population has remained low, within the range of 1.9–3.3% for the past 10 years (see Figure 11.1). In addition, the country has received recognition as a role model from the international community in many areas, including education (OECD, 2012), healthcare (World Health Organization, 2016), economic competitiveness (World Economic Forum, 2015), and human development (United Nations Development Programme, 2015).

Analysts argue that Singapore's success can be attributed primarily to the government's ability to achieve a balance between its open-market economic policy and the distribution of wealth among its citizens (Low, 2001; Sung, 2006). Essentially, the government is able to convert the economic gain into a high level of basic well-being among its citizens in the fields of housing, healthcare, security, and education. Investment in education and training has always been a top
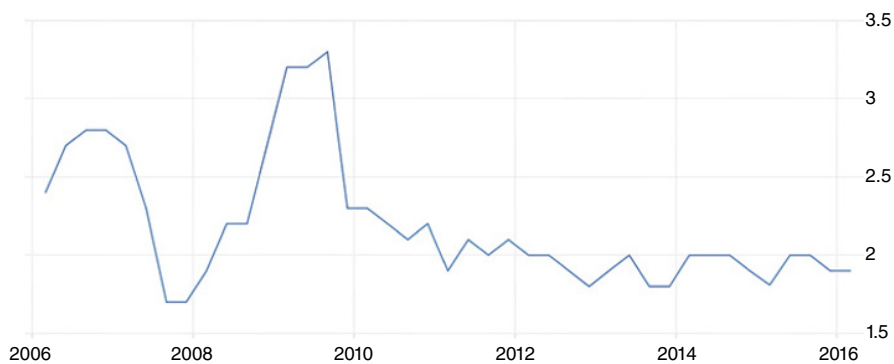
Figure 11.1 Singapore's unemployment rate, 2006–2016. *Source:* Data from Ministry of Manpower.

policy priority for the Singapore government. This policy is founded on the fundamental belief that a skilled workforce is the only way to ensure the creation of employment because skills and employment offer the best social safety net.

In tandem with the policy priority on skills strategy, the Singapore government introduced the SkillsFuture movement in 2015 to promote skills mastery for individuals (Shanmugaratnam, 2015). This constitutes a major policy shift from primarily focusing on front-loaded pre-employment education to lifelong learning (Shanmugaratnam, 2015). It also entails moving away from an employer-CET approach to one that also empowers individuals to make decisions on continual education and career planning (SkillsFuture, 2016a). Under the SkillsFuture movement, individuals are encouraged to access more than 8,000 work skills–related CET courses provided by 1,000 providers. Government provides generous course fee subsidies for the majority of the courses. In addition, Singaporeans age 25 and older also received SkillsFuture credits to pay for their skills training, and the government has promised to top up the credit regularly. Besides empowering individuals to access skills training, SkillsFuture also launched the Study Award and Fellow Award in high-growth sectors to accelerate and recognize skilled mastery in various fields (SkillsFuture, 2016b). The Study Award targets early to midcareer Singaporeans, and each awardee receives funding to defray expenses related to skills-upgrading courses. Annually, 100 SkillsFuture fellowships are awarded to Singaporeans who demonstrate significant depth in their field of practice.

Essentially, the aim of the policy is to enable individuals to progress in their respective fields of practice and so constitutes a break from the traditional pursuit of academic qualifications. The current Acting Minister of Education for Higher Education and Skills summarized SkillsFuture as follows (Ong, 2016):

> Our vision of high performance centers on the intrinsic worth and potential of a student, a vision that requires a dial-back from any excessive focus on academics and paper qualifications at all levels. We each have different destinations — the village, the city, the seaside, the oasis, the valley, the riverbank. It is a function of our gifts, our dreams, our resourcefulness,
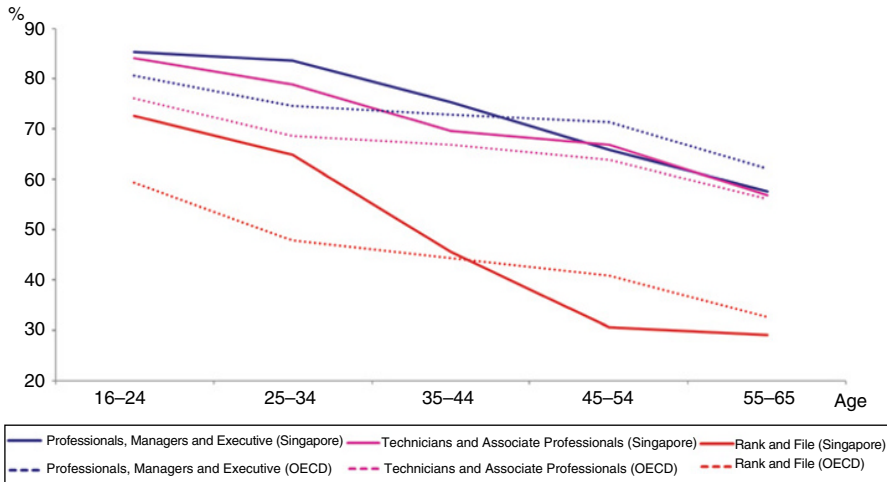
Figure 11.2 CET participation by education level. *Source:* This figure was developed using Programme for the International Assessment of Adult Competencies (PIAAC) data.

> and our luck. And we all find different paths to get there. Our children are growing up in a new world — striking paths into a Singapore that is more inclusive, all-embracing, a place where we can celebrate diverse talents and gifts. Education must remain at the heart of their journey, guiding them in purpose, equipping them with skills, and helping them seize the many opportunities of their age. (p. 1)

However, despite the rhetoric of the minister's statement, we need to ask: Is the SkillsFuture policy truly designed for everyone? Are the employees in low-skilled and low-wage sectors included in SkillsFuture? This chapter discusses these questions by drawing on a research study that examined the accessibility of the skills agenda of the low-skilled, low-wage employees in Singapore.

Despite the government's investment of resources and tremendous effort in the promotion of lifelong learning and skills mastery over the past 50 years, some segments of the workforce are still lagging behind in CET participation, as shown in Figure 11.2. The data show that the rank-and-file (those in blue-collar jobs) Singapore workforce suffered the steepest decline in CET participation after age 34. The older rank-and-file's CET participation is far lower than that of their OECD counterparts.

It is important to point out that the low CET participation rate for the less educated is not exclusive to Singapore; other economies have seen similar effects (Gvaramadzem, 2010; Nixon, 2006; Pocock, Skinner, McMahon, & Pritchard, 2011). Some analysts have pointed out that the design of VET systems that are solely tailored to the needs of enterprises is not conducive for individuals (Keep, 1997). Most VET systems are designed to prepare young people for entry into the labor market, with the focus on employers' skills need. These systems often pay limited attention to potential barriers that impede individual participation, especially for older, less educated workers. Scholars

have highlighted that the absence of a risk-mitigating mechanism for firms (e.g., losing trained workers to competitors due to unethical poaching) and workers (e.g., the high opportunity costs of attending training and the uncertainty of post-training outcomes) has resulted in their reluctance to invest in skills upgrading (Estevez-Abe, Iversen, & Soskice, 2001).

Those who champion the concept of high-performance work practice have posited that firms in low-skills sectors are less likely to value skills strategies and, therefore, will not invest in the skills of their employees (Ashton & Sung, 2002). As such, the only way to entice firms to embrace skills competitiveness is to nudge firms toward the high-skills road. Nonetheless, some analysts (Brown, Lauder, & Ashton, 2011; Keep, Mayhew, & Payne, 2006) have rejected such a claim by pointing out that skills competitiveness remains low on the business agenda of many enterprises. The various debates on individual and firm behavior toward skills have converged to hone in on the need to analyze the institutional factors and workplace practices of the low-skilled, low-wage sector, which is aptly captured by Rainbird (2000):

> In order to understand issues relating to low-skilled workers' access to training, it is first necessary to investigate the context in which they and their workplace make decisions about formal learning. This requires a dual focus: on the nature of work which is considered to have a low skills content and on the workers who occupy these positions in the structure of the organization, on the other hand, and/or because of their status as subordinate members of society, due to ascriptive characteristics such as class, gender, race and others. The extent to which access to learning is seen as linked to problems faced by the individual or to the structural characteristics has consequences for the ways in which patterns of inequality in access are reproduced or can be challenged. (p. 184)

The case study research presented here was designed to uncover the nature of and relationship between the context of low-skilled employment, the extent of workplace affordances for formal learning (or the lack of), the conditions in which the firms operated, and the current CET system. The private security services industry was selected due to its high profile within the Singapore policy arena for both its role in national security and its poor showing in productivity and high incidence of low wages. The purpose of the study was to unveil the institutional and circumstantial factors that may have impeded the access of low-skilled, low-wage workers to CET.

The study drew upon a range of different data, including secondary sectoral data, employment data, as well as large-sample quantitative studies involving the buyers of security services, security services employers (also known as security agencies), and security workers. However, the primary method of data collection was through interviews with a variety of stakeholders from the security industry, along with those associated with it. Specifically, in-depth interviews were conducted with the sectoral regulatory authority, government agencies, security industry associations, sectoral labor unions, the National Trade Unions Congress (NTUC), the Workgroup for Security Sector Productivity, the Security Industry Institute (for training), security workers, and security agencies. The names of the

interviewees are anonymized in this chapter. This combination of the primary and secondary data enabled the construction of a detailed picture of how low-skilled, low-wage security jobs are created and maintained in the economy.

The chapter is organized in a further three sections. The first begins by explaining the concept of "inclusiveness" within the context of the Singaporean model of the *developmental state economy*. It then presents the perspective of the low-skilled, low-wage employees and their apparent resignation regarding their place in society, their struggle to maximize their contribution in exchange for welfare benefits, and their limited access to CET. The next section evaluates the key skills supply interventions that have been introduced by the government, including the Security Workforce Skills Qualifications (WSQs) framework, course fees subsidies and other monetary incentives, and the more recent push for the Progressive Wage Model (PWM) for the low-wage sectors. The chapter concludes with an evaluation of the government's national skills strategy and its claim of inclusiveness for all.

Low-Wage Workers as "Stakeholders" in the Developmental State

The inclusive policy agenda of Singapore is different from the welfarism of the West, particularly the Nordic social-democratic regime with its emphasis on the equality of outcome (Esping-Anderson & Myles, 2009). In contrast, the notion of inclusiveness in Singapore is focused on equal opportunity. Essentially, the government sought to develop and sustain inclusiveness through the promotion of active participation in the workforce, as encapsulated in four principles set out in a report by the Ministerial Committee for Low-Waged Workers (MCLWW, 2009):

1) *Continued economic growth:* Job creation is the best assurance that low-waged workers have for a better future. At the same time, we should not erode our workforce's competitiveness and flexibility to respond to unexpected challenges.
2) *Preservation of our work ethic:* Singapore has achieved prosperity over the years through our emphasis on self-reliance and a strong work ethic. These values should still be emphasized in our endeavor to help low-waged workers.
3) *Equity and assistance for low-wage workers:* Singapore has an open economy that is heavily reliant on external trade. Artificially raising wages without raising productivity will cause companies in Singapore to lose their competitiveness and lead to their relocation to other countries, which will result in job losses. To help low-waged workers to improve their income, we must provide them with adequate opportunities and rewards to move up.
4) *Focus on children:* Children from low-income households face multiple challenges, in addition to financial difficulties. To enable these children to maximize their potential, adequate support must be provided to help them complete their education and acquire skills to ensure that they will be employable. (pp. 9–10)

This model of welfarism is what I have termed *developmental welfare capitalism* embedded within the developmental state economy. The developmental state ideology privileges structural-institutional state power in achieving economic development. It has been regarded as establishing a powerful, competent, and

insulated state bureaucracy that manages nonstate economic interests effectively (Johnson, 1982; Leftwich, 1995). Developmental welfare capitalism (Gog, 2013, p. 75) is characterized as follows:

- *Economic primacy:* Central coordinated economic strategies to ensure sustainable growth, competitiveness, and job creation
- *Job as the best social safety net:* Social and labor market policies aim to enable and reward works.
- *Skills upgrading is the only way up:* Infrastructure and systems available to support the general workforce on the pursuit of education and training
- *Family:* Imposition of primary responsibilities of caring for the old and young on family members
- *Child-centric investment:* Education is expected to provide a level playing field for all to pursue social mobility, regardless of family background.

The MCLWW (2009) report also claimed that being employed, even in a low-paid position, is accompanied by a slew of benefits. They include income supplements, housing grants, financial assistance for children's education, top-up of a central "provident fund" (a compulsory saving plan for future medical and retirement needs), and a high level of subsidy for course fees for skills upgrading. Essentially, within the context of Singapore, the production of labor is driven by the individual's perceived need to provide for self and family (Chua, 1995; Mathi & Sharifah, 2011). According to Sung (2006, p. 93), the "stakeholding" approach of engaging the workers is designed to cultivate the collective belief in a "self-reliance" mindset in the workers.

To examine how these ideas affect the lives of low-paid workers, I now present data from the interviews I conducted with five employees in the private security industry. They shared a similar social economic background. The two females and three males had barely completed their secondary education, and, as they believed they were not academically inclined, they had resigned themselves to jobs that seemed commensurate with their skills levels. They displayed the traits of being hardworking and self-reliant. They had not stopped working since they entered the labor market. Feeding themselves and their families was their priority. Thus, they believed that as long as they remained gainfully employed, they would qualify for the various government transfers and supports. The profiles of the five security employees are shown in Table 11.1. All of them were born in the era of the "Survival Driven" phase of nation building, when education policy was underpinned by realist philosophy (Tan, 2006). The Survival Driven phase, from 1959 to 1978, was the time when Singapore gained independence from its colonial master. The economy went into a high gear of industrialization to create jobs for its people. This meant the focus of the education system was to produce trained workers for industrialization; hence, there was a push for postsecondary technical and vocational education (Gopinathan, 2015). Nonetheless, my five interviewees did not make it to postsecondary education, primarily due to the need to support their families financially and their academic performance.

This group shared the same profile as the overall workforce in the private security industry. Figure 11.3 shows the profile of the security employees: 80% of the security workforce has secondary or a lower level of education. Among them, 60% are age 40 and older.

Table 11.1 Profiles of the Five Security Employees.

Pseudonyms	Age	Gender	Marital status	Education level	Year in current work site	Time in security sector	Changes in employers in security field
Waty	50	Female	Married	Secondary 2	7 months	1 year 9 months	3
Siti	48	Female	Married	Secondary 4	1 year 9 months	2 years 3 months	2
Loke	42	Male	Married	Secondary 4	2 years	2 years	1
Lee	53	Male	Divorced	Secondary 4	5 months	5 years	3
Nathan	49	Male	Married	Secondary 4	1 months	9 years	3

Age Profile

- 29 & below
- 30–39
- 40–49
- 50–59
- 60 & above

Education profile

	No formal education	Primary education	Secondary education	Post-secondary non-tertiary	Tertiary
■ Series 1	3%	11%	66%	10%	10%
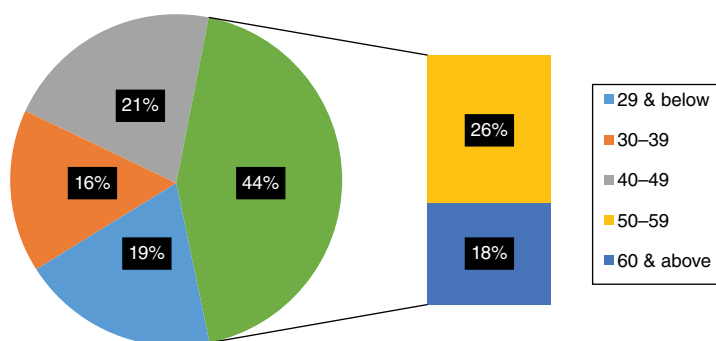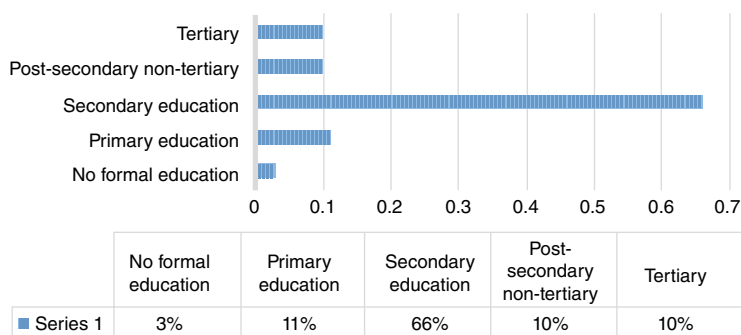
Figure 11.3 Age and education profile of the private security industry employees. *Source:* Data from the Security Sector Manpower Development Study Report by the Research Pacific Group, 2010. Adapted with Permission from the Singapore Workforce Development Agency.

The extent to which the stakeholding concept can be said to have penetrated into the consciousness of the low-wage workforce is revealed in the following extracts from the narratives of the interviewees, which explain their willingness to take up low-wage work:

> At first, I worked in a factory as an operator for many years; then I was retrenched. Then, I worked as cleaner and cleaning supervisor; the contract also ended. I tried to sell *kuey* [local tidbits] … because I needed to support my family and have a job.… They [public employment officers] asked me to take up security job. (Waty)

> I was in manufacturing, doing metal stamping. The company shifted overseas; I was retrenched. I went for lots of interviews, but nobody wanted me. My wife is not working and my son is in primary school. I have to worry about my home mortgage. So I decided to take up security job. The pay is low, but it is more secure. (Loke)

> My husband and I both got retrenched from the same factory. We went to public employment service center for help; they gave us a one-week food voucher and transport voucher. I have no qualification and because of my age, I can only choose between cleaner and security officer. Then they sent me for an English course and security training. (Siti)

These three employees exuded a strong sense of self-reliance. They were highly conscious of the importance of income security. The problem of low pay did not appear in their mind. Having a job, albeit low paying, is better than no job. The benefit from employment means they could care for self and family. Their stakes are high. Sung (2006) has described how the stakeholding approach has successfully encouraged workers to participate in economic activities in Singapore:

> The essence of the developmental state strategy is that all workers have to maximize their contribution in terms of their ability, and in the end they all create their own stake-holding vis-à-vis their respective input into economic development process. From this perspective, stakeholding through welfare provision under the developmental state is not about equality. It is all about establishing one's own stake within society under the leadership of the developmental state. (p. 93)

Lack of Access to Skills-Upgrading Opportunities

The private security services industry has received considerable policy attention due to its high volume of low-wage employees and its persistently low level of productivity (Security Sectoral Tripartite Cluster, 2015). In an attempt to overcome poor performance, the government decided to embrace skills upgrading as part of improving industry capability. The Police Licensing and Regulatory Department (PLRD) and the Workforce Development Agency (WDA) have

developed a competencies and qualification framework for the security industry under the Singapore Workforce Skills Qualifications framework (WSQ). The framework focused on creating career pathways for skills acquisition (and qualifications) in the security sector to improve productivity and increase wages.

To further entice security employers and employees to participate in skills-upgrading programs, subsidies for course fees ranging from 70% to 90% were offered. Security employees could also get an additional course fee subsidy of 5% under the Workfare Skill-Up (WSU) initiative. The WSU aims to encourage low-skilled, low-wage workers to take their own initiative to attend training courses to improve their chances of being employed. Individuals who successfully completed full qualifications would be further rewarded with a CET completion bonus and a training allowance for the duration of the training when they successfully completed the training.

The Security WSQ offered four level of skills upgrading. The certificate level is designed for the entry-level security employees who perform guarding, patrolling, and access control duties. The high certificate level is aimed at the armed auxiliary police force, who are trained with special skills to carry guns for special security duties. The advanced certificate level is designed for security supervisors who lead a small team of security guards. The diploma level is designed for security managers who have administrative and managerial responsibilities.

However, whether such opportunities are actually available for the security employees is ultimately determined by the internal labor market of the security sector. Statistics from the WDA show that there was a high take-up for the mandatory training stipulated as part of the vocational licensing requirement at point of entry to the sector. However, the subsequent CET incidents were very low. For the small number who embarked on CET from January 2010 to December 2011, only 5% of the 4,200 who were trained reported progression up the career ladder. The promises of a clear career pathway and career advancement through WSQ were ultimately broken promises. There were very limited opportunities for promotion, as higher level job roles were few and far between. One of the interviewees commented on this reality:

> I don't think I will have the chance to be supervisor here. There are two other senior colleagues ahead of me. Unless I quit and join another site … the chances are slim. My agency hardly knows me; I have not spoken to anyone from the agency since I joined this site. (Loke)

The employment conditions of short-tenure site-based contracts also mean that security employers have no impetus to train this group of employees who, in their eyes, are transient. The employment is created when the security agency secures a contract, then the search for workers begins. The employer–employee relationship ceases the day the site contract ends. Two of the interviewees explained what this means for them as workers:

> The frustration of having to prove yourself all over again whenever you join a new agency also means your chances of getting the supervisory post is quite unlikely, unless you are so lucky. (Nathan)

> The [employment] contract is based on the site. Hence, every time, I go for a new interview, I am reset to the baseline. They asked if I want to take up the post of security officer even when I have the supervisor certificate. (Lee)

Furthermore, the site-specific employment contracts and long working hours make it difficult for security employees to undergo skills upgrading, without affecting their work situation.

> It is very shorthanded and there is no relief staff. When someone is sick or something, one of us has to work double shift. I don't see how they can send us for training. (Siti)

> Although my shift officially starts at 8 a.m., we are expected to come in early, change into uniform, and have a handover-duty briefing. I have to arrive half an hour before the shift starts. I do this every day. So, by the end of the week, I would be so exhausted. Unless I go for training during working hours, I don't think I have time for training after working hours. (Waty)

> Currently, all the training classes are weekdays between 9 a.m. to 9 p.m. It is totally impossible to attend outside training without the support from my agency. (Nathan)

In fact, leaving work for training has a punitive effect on the take-home pay of security employees. As their basic pay is low, the overtime pay makes up a large proportion of their gross salary:

> I was so happy that my agency finally sent me for training. Later, I was shocked that my pay was cut because they only paid me the basic pay. My family suffered when I went for training. (Nathan)

On the whole, the evidence from the interviewees suggests there are attitudinal and situational factors that propel disadvantaged low-skilled adults toward low-wage jobs. Specifically, their premature exit from formal education at the onset has limited their choice of employment. All the security employees interviewed have been recycling in low-wage employment since their very first job. Moreover, the only time that the security employees underwent CET was via the public employment services when they were unemployed. The training they received was tailored specifically to the available job positions that were commensurate with their low education level.

It is also apparent that the low-skilled, low-wage security employees have very limited upward career mobility opportunities within the sector. The chances of being recruited at a post higher than security guard is near zero. As part of the research, I tracked security recruitment advertisements in local newspapers over a 10-day period. This revealed that there was not a single vacancy for a security supervisor, whereas there were abundant vacancies for security guards. Thus, there is no economic impetus for them to participate in CET. One of the security employees called it a "dead-end job, but secure," because it would not be affected by offshoring.

Failed Attempts to Raise the Skills and Wages of the Security Sector

Given a key aim of government has been to raise the skills and wages of the security sector, my case study research examined two key policy initiatives that were introduced for this purpose. Part of this analysis also involved interviewing security agency managers to gain their perceptions of how far the new initiatives were having an impact on the industry.

Work Group for Security Productivity

The first policy initiative I examined was introduced in 2011, under the remit of the National Productivity and Continuing Education Council (NPCEC). The Work Group for Security Productivity (WGSP) was set up to establish a productivity blueprint for the sector. The goal was to raise productivity by 3% each year in order to raise wages, including in the private security sector (Ministry for Trade and Industry, 2012). Besides the continuation of Security WSQ training, the workgroup also introduced the Innovation Growth Plan with the assumption that the use of security technology would correspondingly raise the skills level of security employees and the sector would be less labor dependent. The security productivity blueprint developed by the WGSP made little headway. Three of the security agency managers who participated in the study discussed the possible reasons:

> There is a limit to how security technology can improve the work of the security guards. Honestly, how much can you improve their work? I don't get paid more if they work harder or faster. (Tan)

> I think they [buyers] have budget constraints. Not everyone can and wants to install security systems because of costs. (Gopi)

> If only the customer would listen to us, we are not here to sell them many guards. We are here to tell them the bare minimum they can get by, but they said "just follow the spec"; so we just quote accordingly. (John)

These comments imply a lack of autonomy in designing and proposing security solutions to their clients. Traditionally, private security is an outsourced service where the tender specifications dictate the number of security personnel needed for the site. As a general norm, the tenders are awarded to the cheapest quote. During the interviews, the security agency managers were lamenting the way that "cheap-outsourcing" practices have annulled the PLRD's compulsory annual grading exercise, which aimed to differentiate the performance of the security agencies with the hope of improving their business chances.

> It is all up to the buyers. They can specify grade B and above in the tender, but they still pick the cheapest. Ultimately, it is about price. (Ken)

> Based on past experiences, I think clients only differentiate between grade B and above versus grade C and below. There is no difference between A and B grade. You can see that in the tender bids. (Gopi)

Notably, the common practice of short contract tenure, which was reported to be between 12 and 24 months, allowed the buyers to manage potential contract price increases. This has inevitably affected the employment contract of the security employees and suppressed wages. The "cheap-outsourcing" contract also pays no heed to the skills that security guards deploy beyond the vocational licensing requirement. Two of the security agency managers commented,

> Only some high-end condominium or high security plants may stipulate additional training for guards deployed to their sites. Such as CPR or first aid. They would demand to see proof of training during the first month of contract. (John)

> Buyers dictate the price … unless they are willing to pay more, there is no way for me pay the guards more. Maybe government should top up the workers' salary. (Tan)

The picture painted by the security agency managers was one where the security agencies operated in a hostile environment where they were entrenched in a low-skills road. Cheap-sourcing with low tender prices, short contract terms, and low-skills demands resulted in them producing low-skilled, low-wage employment. Consequently, this created a vicious cycle of unattractive, low-wage, dead-end jobs; rampant poaching of staff; and penalties imposed by clients due to absenteeism of staff. Two of the security agency managers shared their frustration:

> They are [security employees] mercenaries. They would leave for the extra dollars. It is very frustrating! It does not help when PLRD allows the licensed guards to work for two employers; it should be one! Some work for one agency in the day shift, change uniform, and work for another agency in the night. Next day, too tired, did not report duty. (Tan)

> Agencies like us are toothless. I told the guard: You sleep on duty, I sack you! Sack lor! He goes to the next employers. Then we are penalized by our customer! PLRD should hold them individually accountable. We are at their mercy. (John)

The Progressive Wage Model

The PWM was initiated by the NTUC to enhance the basic wage of low-wage workers through skills upgrading and productivity improvement. This was implemented by government in three low-wage sectors: cleaning, landscaping, and private security (Ministry of Manpower, 2016). Within the context of the security sector, a sectoral tripartite cluster (STC) comprising representatives of NTUC, security industry associations, service buyers, and government agencies (MOM, Ministry of Home Affairs, WDA, and PLRD) was formed. It was tasked with identifying the core security-related skillset for the career ladders and stipulating corresponding wages.

According to the security STC, the security employees suffered from basic wage decline. Although their median gross wage had increased moderately with overtime,

the ratio of basic to gross wage had deteriorated from 0.54 to 0.47. The wage of the security employees is way below the two-thirds of median gross wage of the workforce. The STC attributed the declining basic wage to low-cost sourcing of security services and the overtime exemption. Overtime exemption is a unique exception granted by the Ministry of Manpower, which allows security employees to work beyond the 72-hour overtime limit per month under the Employment Act. According to the STC, on average security employees worked 92 hours of overtime per month, which is the highest overtime rate across all industries. This explained the view that there was "no time no chance" for training.

Although the government and the NTUC rejected the concept of a minimum wage, the PWM is essentially a legislated minimum wage pegged to skills and job roles (Ho, 2016). The assumption underpinning the PWM is that by specifying skills for job roles, it is justified in pushing for an increase in the basic wage for the low-wage security employees. For example, if the security agency wishes to deploy the security guards to perform the functions of "manage disorderly conduct and threatening behaviour" and "operate basic security equipment" as part of the service contract, they will have to pay the minimum basic wage before overtime.

However, security agency managers interviewed for my research were skeptical about the PWM's role in improving productivity, as the following comments reveal:

> They [STC] think that this will justify the salary increase. Nothing change. The buyers' contract will adjust to the lowest level of guards they want to buy. They won't specify the need to operate security equipment. Moreover, it is not clear what is considered basic security equipment. Telephone? Walkie-talkie? Anyway, they won't pay. (Sam)

> The skills-wage ladder is artificial. The market won't need SSO [senior security officer]. We will just employ maybe one supervisor with the skills of senior security officer. It makes sense for us to minimize cost. How often do you have to manage disorderly conduct? (Tan)

Thus, the security agency managers shed light on the reality on the ground. The good intention of the PWM is likely to raise the basic wage of the entry-level rank of security officers and perhaps the security supervisor. The entry-level security officers account for the biggest number of workers in the sector, whereas the security supervisors account for about 10% of the workforce. The PWM's skills–wage ladder looked good in design, just like the Security WSQ framework, but the effect is limited in terms of skills upgrading for better wages and productivity. Essentially, the PWM is a minimum-wage scheme justified with minimum skills. The minimum wage and minimum skills do not link to productivity enhancement at all.

My interview with a representative from the Security Industry Institute (the security sector's training center) revealed that the take-up of training was lackluster. The security agencies continued to send security officers for training according to the requirement of the site contract. Those security officers who

self-funded the additional training for higher job roles (e.g., senior security officer [SSO] or security supervisor) were betting on a better future. In my interviewee's view, these workers might be disappointed.

> 50% of the class was self-funded. They were pinning hope for better deployment. I am not so sure. The industry does not operate like the PWM plan. (Gordon)

An evaluation of the PWM published in Singapore's main newspaper, *The Straits Times*, revealed that the take-up rate of training participation stipulated in the PWM was low, and less than 50% of the security agencies were ready to embrace the new basic wage. The report ascertained that use of cheap-sourcing contracts continued to bid down the wage of the workers:

> To make matters worse, employers bidding to retain a contract with established workers due for a pay rise are undercut by rivals who base their tender price on entry-level pay rates. If newcomer takes over the workers at the site, the new employer can then reset their wage to the minimum, along with any other benefits, such as leave, that they might have accrued during the previous contract. (Ho, 2016, p. 24)

Ho (2016) reported the response from the NTUC representative in charge of the PWM on the effectiveness of the PWM:

> The PWM is not a magic wand in terms of pushing wages up. We have to look at other aspects to improve productivity of workers to make wage increases sustainable. (p. 24)

What the evidence points to is that skills do not appear to matter in a sector that is entrenched in cheap-sourcing practices. Unlike other industries in which firms have discretionary power over product/services and process design, the outsourced nature of the security service means that security firms have no autonomy over job design and skills need. The site contract is the only bind between the security firms and employees. The transient relationship does not afford for any form of investment in skills for either party.

Conclusion

The case of the private security services industry in Singapore illuminates the lack of incentives to embrace a high-skills road due to the industry's productive system (Felstead, Fuller, Jewson, & Unwin, 2009). The security firms operate in a highly hostile environment that entrenches them in a low-skills road. Obviously, a skill strategy is not the viable solution until the institutional logic is changed. The current logic continues to trap the security employers in creating low-skills, low-wage employment and for the low-skills individuals to recycle in low-wage employment with limited access to improve their situation.

As we can see from this case, the creation of bad jobs is not solely the fault of security employers. The historical practice of cheap-sourcing has created the conditions of short employment tenure, suppressed wages, and disregard for skills (on permeable organizations, see Rubery, Carroll, Cooke, Grugulis, & Earnshaw, 2004). The inability for the security industry associations and the security employees' union to join forces to correct the cheap-sourcing practice among the service buyers is problematic. To be fair, the security employees' union through moral persuasion has persuaded the public sector to move toward performance-based contracts. This was a significant breakthrough, even though the public sector takes up 14% of the private security services (National Trade Unions Congress [NTUC], 2015). The performance-based contract aims for an effective and efficient security solution, instead of stipulating the headcount of security guards. This has granted the security agencies some autonomy in designing security solutions, which may include the use of security technologies and deployment of higher skills security employees. More works need to be done in changing the cheap-sourcing practice. Until then, the concept of a skills strategy will be irrelevant for the security sector.

In relation to the low-wage employees, the current CET offering, which is tightly coupled with low-end employability, will continue to limit their access and disincentivize them to learn. The kind of learning that the security employees have participated in has been restricted to mandatory security task training tied to the vocational license to work. Having observed the training sessions as part of my research, I was able to confirm that the training was primarily preparing the individuals to pass the task-based assessment. This narrow conception of vocational skills and learning does not produce the intrinsic rewards generated through the act of learning.

Furthermore, there is limited attempt within the CET and public employment facilitation in helping low-skilled workers get out of low-wage employment. The learning required to progress to higher quality jobs was not accessible to them. There is no attempt currently to raise the level of essential academic skills (e.g., English, mathematics, and science) as a bridging step to enable adult workers to access higher level learning. This is attributable to a number of reasons. First, the higher learning institutions have no incentive to offer bridging courses for the group of learners whom they deem to be at a high risk of attrition. Second, the country's easy access to inexpensive skilled foreign labor has disincentivized employers from employing and training the available low-skilled adults for higher skills jobs. Third, the current CET system, which is built upon a sectoral skills framework with career paths and corresponding wage ladders, expects individuals to navigate their learning and career journey through the skills system and compete based on merit and hard work. Such a system is not built for inclusiveness; it is built for meritocracy. To enhance the accessibility to CET and the corresponding outcome of accessing quality jobs for low-skill, low-wage workers requires special efforts. A good case in point is the Project-QUEST in San Antonio, Texas (Rademacher, Bear, & Conway, 2001). The success of Project-QUEST is attributed to its clear focus on (a) improving the lives of low-income families, (b) reducing their dependence on social assistance, and (c) turning them into tax-paying citizens.

Project-QUEST first identifies jobs that pay families a living wage (high enough to cover the costs of raising a family) and offer real career progression prospects. They work with employers who have such vacancies and then partner with community colleges to design programs to help the low-skill job seekers to get into the jobs. Special efforts are made to help potential employers redesign jobs and turn them into good-quality ones. The community colleges then offer 3-month bridging programs to prepare the low-skill adults with the adequate level of academic competencies prior to their enrollment into vocational programs. Once they have been selected for the program, the low-skill adults are offered a comprehensive financial assistance package (Project-QUEST works as an integrator of various financial schemes from different government departments). The long-term effect of such efforts, as tracked by Project-QUEST and Prince (2008) in similar projects in the USA, appears to be effective. Most notably, the project has been successful in moving low-skill, low-wage individuals into non-low-wage employment, with the corresponding long-term effect of raising the social capital of their families.

As of now, it is hard to see how low-skilled, low-wage workers in Singapore can access or will benefit from the SkillsFuture initiative, which claims the following (SkillsFuture, 2016b):

> SkillsFuture is a national movement to enable all Singaporeans to develop to their fullest potential throughout life. Whichever stage of life you are in, whether you are in your schooling years, early career, mid-career or silver years, SkillsFuture will enable you to take advantage of a wide range of opportunities—to help you realise your aspirations and attain mastery of skills.

The consolation for the security employees is the continuous access to highly subsidized training whenever they are out of employment. Hence, their aspiration to have employment with a meager income is assured, along with the skills they need to stay employed.

As with many advanced economies, skills will continue to be a key policy in Singapore (Keep, 2009; Lafer, 2004), and the pursuit of skills policies may well be relevant as Singapore continues to transform its economy. The well-educated will benefit from the SkillsFuture initiative, but it may be less relevant for the bottom of the workforce, as Keep and James (2012) have remarked:

> In some sense, the official obsession with upskilling as an answer to bad jobs has thus been a form of displacement activity that has allowed government to avoid confronting structural problems in the labor market and the workplace. (p. 251)

It could be argued that the inclusive agenda for the vulnerable low-skilled, low-wage population in Singapore is being achieved through other means beyond skills, whereas the SkillsFuture initiative will continue to provide hope for a better future.

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Part III

Arrangements for VET

12

The Contested Evolution and Future of Vocational Education in the United States

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Introduction

This chapter provides a historical context for examining the emergence and development of vocational education, now known as *career and technical education* (CTE), in the USA. First funded by federal legislation almost exactly a century ago, vocational education progressed from high schools during the early twentieth century to include community colleges by midcentury, and it continues to evolve to support student progression from secondary to postsecondary education and employment. Career pathways to improve progression have support from federal public policy as well as private philanthropic funders. These public initiatives speak to the importance of educating the increasingly diverse population of US citizens. The chapter concludes with a discussion of the opportunities and challenges that CTE and career pathways face as the USA enters a new era under the Republican-led Trump administration.

Historical Context

The decision to integrate education for employment into public education in the USA was made almost exactly a century ago, and it was one of the earliest in the country to establish a formal role for the federal government to flow monies to states to fund education at the local level. It was an important development because education in the USA was then (and continues to be) the primary responsibility of states, in conjunction with local government. The Smith–Hughes Act was passed in 1917, when the US Congress authorized states to use federal funds to educate high school students in a limited number of occupational areas: agriculture, manual training, and domestic science. Passage of this law reflected successful arguments made by federal policymakers and the business elite that the

children of the working class had few opportunities for good jobs if vocational education was not made available to them. To institute this landmark curricular change, newly forming high schools were encouraged to offer vocational classes to students of age 14–18 years according to their gender, with males enrolling in agriculture and the trades and females in domestic science. Then, as is true now, these programs of study (POS) were established at the state and local levels and not dictated by the federal government, although federal legislation has increasingly required states and local education providers to meet "core" learning standards from kindergarten level through to K–12 (age 18).

With a strong coalition of support from public and private groups, advocates for vocational education argued that occupationally focused classes would prepare students, mostly working-class youth, to be successful workers (for boys) and good parents (for girls), but critics warned against creating a separate system of education that could limit these students' upward mobility (Lazerson & Grubb, 1974). Industrialists such as Charles Prosser (1913) promoted practical and occupationally focused curricula as an alternative to having students drop out before K–12 because of their presumed limited ability or interest in academic studies. Prosser often coupled his remarks supporting vocational education with the necessity to prepare future workers for manufacturing jobs to strengthen the nation's industrialized economy. He believed, as did many others, that it was the mission of high schools to prepare working-class students for employment commensurate with their finding a proper place in society (Wonacott, 2003; see also Chapters 3 and 13, this volume, for a discussion of John Dewey's alternative philosophy of vocational education and its impact in the USA and Canada).

Under the Smith–Hughes Act, some states funded and operated vocational education separately from the rest of K–12 education (Hillison, 1995). They also funded vocational teacher preparation programs separately from teacher preparation for the rest of the high school curriculum, which focused on instruction in the liberal arts and sciences and general education (Rojewski, 2002).

This separation created other fiscal challenges. For nearly 50 years, legislation on vocational education prohibited use of federal funds beyond the high school level, allowing vocational classes to take root and grow at the secondary education level while restricting growth at the postsecondary level. Both implicit and explicit targeting of students who presumably had little interest in academic studies were tracked into vocational programs according to their gender, race/ethnicity, and income, resulting in vocational education for the working class versus academic education for more privileged students (Wirth, 1992). As time passed, working-class students were increasingly accepted as the primary beneficiaries of vocational programs.

Expansion of Vocational Education to the Postsecondary Level

After World War II (WWII), the expansion of vocational education to the postsecondary level was advanced by distinctive, but also complementary, arguments and developments. First, postsecondary education was recognized as a way to

address widespread ignorance of the US public toward international affairs, helping to fill the knowledge gap that resulted from the nation's historic isolationist policies. The fact that the country had large segments of its citizenry who had never heard of countries against which the USA had taken up arms was perceived as a serious threat to national security. President Truman, whose presidency is attributed with helping to end WWII, was the child of a working-class family who could not afford to send him to college. Loving learning but troubled by his own lack of a college education, Truman organized a group of policymakers and scholars to take on the enormously important job of considering the future of all of education for the USA.

The Truman Commission advocated for the creation of postsecondary education systems administered by the states to expand access to college to a much greater proportion of the US population. It called for postsecondary education on a scale considered unaffordable and frankly unnecessary prior to WWII, but now thought to be more palatable after the nation had faced and overcome global conflict. Whereas the Commission's recommendations were cast as too liberal for the country, some ideas resonated with policymakers and eventually rose to the level of debate by federal policymakers (Gilbert & Heller, 2013). One area was the development of state systems of "community colleges" to expand postsecondary education so that it would become within reach of every citizen (Gilbert and Heller, 2013, p. 431). The expansion of vocational education curriculum was viewed as vital to the growth of community colleges nationwide.

Complementing recommendations of the Truman Commission, other commissions and task forces convened during the mid-twentieth-century period and advocated for vocational curricula to prepare more workers for growing employment opportunities in health sciences, manufacturing, business, and other fields. These groups envisioned POS of 2 years beyond high school to culminate in Associate of Applied Science (AAS) degrees. These degrees, like vocational education in high schools, were deemed to be terminal—leading to "semi-professional" jobs (Calhoun & Finch, 1976). This deliberate stratification of education linked to distinctive credentials meant vocational education now extended beyond high school, but below the level provided in the universities to prepare students for professional jobs.

Reflecting this stratification, the Vocational Education Act of 1963 opened the door to federal funding at the postsecondary education level for the first time. At this time, 2-year colleges were called junior colleges, technical colleges, or community colleges. The Act recommended the following distribution of federal funds by the states to students beyond typical high school age: 20% for students between 20 and 25 years old, 15% for students between 25 and 65, and 5% for students of any age, with the remaining 70% of federal funds appropriated to the high school level (Calhoun & Finch, 1976). Subsequently, legislation from the late 1960s to the mid-1970s further expanded the federal government's support for vocational education at the high school and college levels. To reinforce the specific focus on *semiprofessional* occupations, federal legislation mandated that credentials conferred to graduates be considered *sub-baccalaureate*, reinforcing their terminal focus. As a result, various forms of applied associate degrees, certificates, licenses, and other credentials have emerged organically without

government intervention and are proliferating, particularly in sectors of the labor force that are growing, such as healthcare (Carnevale, Rose, & Hanson, 2012).

The expansion of vocational education provided the opportunity to align curricula from the secondary to the postsecondary level, laying the groundwork for articulated course sequences that have continued to evolve since that time. Federal funding also encouraged professional development for individuals teaching and leading vocational education and incentivized the adoption and expansion of new programs. For example, career education as a distinctive field of theory and practice emerged in the 1970s (Herr, 1987), placing more focus on career awareness and career exploration as complementary to vocational education, but distinct from preparing students for particular occupations.

Expanding Access to Postsecondary Vocational Education

Vocational education through the 1960s and 1970s enrolled an increasing number of college-age students as well as working adults. The vocational mission of community colleges rose to importance to parallel their mission to prepare students to transfer to university, and their missions focused on remedial or developmental education, continuing education, and community service (Cohen & Brawer, 2008). Since then, vocational education has been recognized as a primary mission of the community college curriculum (Bragg, 2001; Townsend & Bragg, 2006). Lazerson and Grubb (1974, p. 1) used the term "vocationalism" to refer to the rise of vocational education throughout all segments of education, arguing it has a detrimental role in tracking working-class students in ways that limit their upward mobility. Later (Grubb & Lazerson, 2007), they acknowledged that some form of vocational perspective is important at the high school and postsecondary levels.

From the late 1980s to the present, the further expansion of vocational education at the high school level has been linked to tracking students by class, race/ethnicity, and gender, resulting in an increased concern for creating opportunities for students to matriculate from high school to the postsecondary level (Evans & Herr, 1978). Articulation agreements between high schools and community colleges began to be formalized during this period with support from state agencies that encouraged and also sometimes approved vocational programs, including course sequences, extending from the secondary to the postsecondary levels.

Whereas the majority of federal funding for vocational education was still directed to the secondary level, the focus on articulation and coordination of secondary-to-postsecondary programming raised awareness of the need to better balance federal funding across the entire educational system. To this end, some states devoted resources to supporting vocational education at the secondary and postsecondary levels, while many others continued to dedicate the majority of federal funds to high schools. Attempting to deal with this continuing imbalance, the federal government directed states and local education entities to dedicate more attention at the high school level to educating students with

intellectual, physical, and other disabilities, referred to as "special populations" (Rojewski, 2002). The legislation also highlighted the need for programs to address gender discrimination by setting targets for the recruitment of nontraditional students by gender into gender-dominant occupations, for example recruiting males to female-dominant healthcare programs and females to male-dominant manufacturing programs.

It should be recognized that these changes to vocational education were happening during a particularly turbulent time for public education. During the 1980s, calls for improved quality and increased academic rigor at elementary and high school levels grew. In a now famous report, *A Nation at Risk*, the National Commission on Excellence in Education (1983), appointed by President Ronald Reagan, called for a widespread overhaul of public education. This report recommended increasing high school graduation requirements, increasing standardized testing of academic achievement throughout elementary and secondary education, and raising the priority of academic education over all other forms of curriculum. An effect of this federal decree was to prioritize academic education to prepare graduates to attend college and deprioritize vocational education to prepare graduates for work. Any student who was deemed capable of participating in academic education was encouraged to do so, resulting in special population students being the primary target audience for vocational education at the high school level.

Instead of removing the federal government from education policy, as Reagan had intended during his 1980 campaign when he promised to eliminate the US Department of Education (DOE), the 1983 report led to a restructuring of education in a direction that was consistent with Reagan's broader conservative economic stance. Clark and Arturo (1986) argue that the focus on equity and social welfare that characterized education policy prior to the Reagan years shifted to common standards and accountability that were expected to raise worker productivity and improve the economy. Simultaneously, the federal role emphasized privatization, arguing for the merits of competition over the inefficiencies of government (Butler, 1986).

Ironically, what emerged from the Reagan years was the "college-for-all" movement that emphasized that college is necessary for all students to engage in the knowledge economy. The Reagan era focus on market mechanisms and individual performance that sorted students by intellectual attainment advocated college for all, but the college-for-all philosophy also resonated with the egalitarian tendencies of public education. High expectations for academic performance, consistent with the increasing demands of the global marketplace, were necessary to maintain the nation's primacy of scientific and technological knowledge (Clark & Arturo, 1986; Glass & Nygreen, 2011). The ultimate effect was that this perspective allowed conservatives to continue to paint themselves as the champions of public education while progressives could tout the benefits of college for a larger swathe of the nation's citizens.

Lynch (2000) has argued that, by the late 1980s, vocational education saw unprecedented enrollments of special populations as "an increasing number of general student groups opted out of vocational education to take core academic courses and as funding favored inclusion of special populations in vocational

education programs" (p. 10). Secondary vocational education became known as a "dumping ground" (Boesel, Hudson, Deich, & Masten, 1994; Lynch, 2000), prompting calls to end tracking in high schools and, hence, ending vocational education within high schools (Oakes, 1985).

Criticism of tracking extended to the postsecondary level, where vocational education programs offered by community colleges were seen as exacerbating unequal education and employment opportunities according to class, race/ethnicity, and gender. Pincus (1980, 1986) characterized vocational education offered by community colleges as giving students a "false promise." In their widely publicized book, *The Diverted Dream*, Brint and Karabel (1989) argued that vocationalization (in contrast to the term *vocationalism* used by Grubb and Lazerson) extended tracking from secondary vocational education to postsecondary vocational programs that prepared students for low-wage jobs that would limit their potential for upward social mobility. The focus on entry-level employment in occupations without logical connections to semiprofessional employment, coupled with the lack of viable transfer options for students receiving applied (terminal) credentials, was characterized by these authors and others (see, e.g., Levin, 2000) as a major impediment to creating educational opportunities for student groups historically underserved by postsecondary education.

In response to this critique, efforts began in the 1980s and continue to this day to improve the quality of vocational education by encouraging students to enroll in rigorous academic education that is integrated with, rather than separate from, vocational education. Also, federal policy emphasizes that high school students who take vocational education need options to matriculate to high-quality postsecondary vocational programs, recognizing that vocational education that culminates at the high school level offers students limited employment options that lead to a living wage. These efforts to improve vocational education grew during the 1990s and early 2000s, when federal funding grew to help grow secondary-to-postsecondary articulation in the form of Technical Preparation (Tech Prep), but also through new federal legislation in the form of the School To Work Opportunities Act (Bragg, 1995).

Secondary-to-postsecondary articulated programs were funded through the Carl D. Perkins Vocational Education and Applied Technology Act of 1990 (Perkins II), and later reauthorized under Perkins III in 1998 and Perkins IV in 2006. These laws increased attention to both academic and technical skill development for all segments of the student population, not exclusively for special populations. Applauding this development, Lynch (2000) noted that "for the first time in federal vocational legislation, emphasis was placed on academics and funds were directed to 'all segments' of the population" (p. 10). Although laudable, it is important to recognize that states continued to use their federal funding for vocational education offered by high schools rather than community colleges, and Tech Prep was implemented as an add-on option rather than a core strategy. This was partly due to the competition for scarce resources and the hesitancy of higher education leaders to challenge historic funding formulas that emphasize secondary schools over postsecondary institutions, despite the shift to encourage all students to attend college. The case for funding for postsecondary

education is further diminished by declining state support at the same time colleges and universities are depicted as flush with resources (see, e.g., Ginsburg, 2011; Mitchell, Leachman, & Masterson, 2016).

The Contemporary Conversation About Vocational Education

Under Perkins IV, the focus on articulation has strengthened, particularly through provisions for POS with an explicit definition that includes integrated secondary and postsecondary education. The term *Programs of Study* (POS), funded under Perkins IV, refers to nonduplicative sequences of courses that integrate both secondary and postsecondary education elements and also include career and academic content. Some POS incorporate early college credit opportunities (referred to as *dual credit* or *concurrent enrollment*), expanded community college credentialing opportunities, and industry credential opportunities where appropriate such as certified nursing assistant (CNA) licensure (Taylor et al., 2009). Perkins IV also introduced the term *career and technical education* to replace the stigmatized *vocational education*. This rebranding was led by the Association for Career and Technical Education (ACTE), which changed its name from the American Vocational Association in 1998 after much debate about how the term *career education* fit into vocational education.

The focus on special populations also continued, but without the priority it was given under previous iterations of federal law, particularly Perkins II, except through funding for low-income students (Lafollette, 2011). To meet these requirements, states focused on POS in different ways. Some reflected a full articulation and integration plan, others continued to operate in silos, and still others worked to connect those silos more explicitly (Lafollette, 2011). In the end, few states put concerns about equity and social mobility at the center of their work.

Perkins IV represented the latest shift away from terminology focused on vocational education toward the use of the term CTE, and this was reflected both in the language of the federal bill and in the vernacular of professional educators and the public (Lafollette, 2011). The aim of those who drafted Perkins IV appeared to be to create legislation that preserved what was perceived as necessary aspects of the vocational education system (e.g., pairing of academic and technical components, integrating special populations into mainstream instruction, and using core indicators to measure performance) while acknowledging the nation's need to educate students for a more globally competitive economic context. Emerging from this work was the notion of aligning POS that integrate academic and CTE with career clusters and career pathways that parallel the US labor force; this was endorsed by numerous federal agencies, including the DOE, but even more prominently the Department of Labor (DOL). This opened the door wider for a more expansive conversation of POS in Perkins IV, partly due to the federal government's decision to allow states to defund Tech Prep in 2010, to demonstrate cost savings by the federal government and to promote the institutionalization of secondary-to-postsecondary POS as integral to all of CTE.

The Newest Reform: Career Pathways

Career pathways emanate from initiatives that have come before (e.g., Tech Prep and "School to Work") and also reflect some of the assumptions and practices of these reforms. As a case in point, the rising prominence of career pathways is reflected in perhaps the most explicit connection of CTE to the US DOL's workforce development system. Three factors come into play. First, a joint commitment of numerous federal agencies to career pathways represents a signal of unprecedented agreement on the direction of workforce and education policy, something that has not happened before in US history. Second, the recent passage of the Workforce Innovation and Opportunity Act (WIOA) further strengthens the tie between CTE and workforce training, with career pathways being a prominent vehicle to bind them together. Third, and perhaps most important, the rising importance of postsecondary credentials in the labor market necessitated the entrée of labor into education policy; this was driven by the fact that postsecondary education was projected to be a requirement for approximately two thirds of the 46.8 million job vacancies between 2008 and 2018 (Carnevale, Smith, & Strohl, 2010).

In 2012, a joint letter affirming the commitment of three federal agencies to a common career pathways framework was signed by the DOE's Office of Vocational and Adult Education (now the Office of Career-Technical and Adult Education, to reflect the name change to CTE), the DOL's Employment and Training Administration, and the Administration for Children and Families of the Department of Health and Human Service (DHHS). Each agency set out to study career pathways in their respective context to determine the relevance and applicability of this idea to their scope of work, with the DHHS conducting a large-scale evaluation of career pathways and the DOL and DOE funding a one-year initiative to create tools and information about career pathways. The DOE also focused attention on tools for supporting adult learners enrolled in career pathways (Dann-Messier, Oates, & Sheldon, 2012).

The joint letter emphasized that career pathways be defined as a sequence of integrated education and training strategies and support services leading to industry-oriented credentials and employment and the opportunity to advance to higher levels of education and employment in that same or related occupational area (Dann-Messier et al., 2012). Table 12.1 sets out the characteristics of this integrated approach.

These efforts toward defining and aligning elements of career pathways are important because of the scope and importance of the commitments to career pathways by the three federal agencies.

This is further reflected in a bill that passed the US Senate, in 2016, to reauthorize Perkins IV, which includes the same definition and understanding of career pathways as in WIOA. On July 31, 2018, the Strengthening Career and Technical Education Act passed and became law. The idea of career pathways remained in the final piece of legislation showing that CTE will be more tightly coupled to the workforce system in terms of deepening the alignment between

Table 12.1 Career Pathway Characteristics.

Elements	Characteristics
Aligned	• Secondary, postsecondary, workforce systems, including adult education
Connected	• Rigorous, sequential, connected, and efficient coursework that links basic education and skills training and integrates education and training
Flexible	• Multiple entry and exit points
Supportive	• Comprehensive support services, such as career counseling, childcare, and transportation • Financial supports or flexibility to accommodate labor market demands in order to allow individuals to meet their ongoing financial needs and obligations
Engaged with Business	• Active engagement of business in targeted industry sectors that are important to local, regional, and/or state economies
Contextualized	• Curriculum and instructional strategies that make work a central context for learning and developing work readiness skills (i.e., contextualized learning)
Accelerated	• Implementation of strategies that accelerate the educational and career advancement of participants (e.g., credit for prior learning)
Accommodating	• Organized services to meet the particular needs of adults (e.g., accommodating work schedules)
Sector-focused	• A focus on secondary and postsecondary industry-recognized credentials, sector-specific employment, and advancement over time in education and employment within that sector
Collaborative	• A collaborative partnership among workforce, education, human service agencies, business, and other community stakeholders to manage the system

Source: Adapted from US Department of Education, Office of Career, Technical and Adult Education (2015).

education and the labor force, offering significant strengths as well as potential challenges.

Understanding career pathways can be complicated. It involves those characteristics listed in Table 12.1, but it is also ultimately about how students progress through POS. This progression, by necessity, requires consideration of how different student populations enter and exit a career pathway at different points, possibly enhancing their labor market potential through the attainment of credentials that may increase wages. Figure 12.1 provides an example of a manufacturing career pathway, focusing specifically on the community college aspect of the pathway.

It is important to notice that career pathways are meant to enroll both high school students and returning adults. The pathway for high school students offers various credential and employment options such that, if a student decides
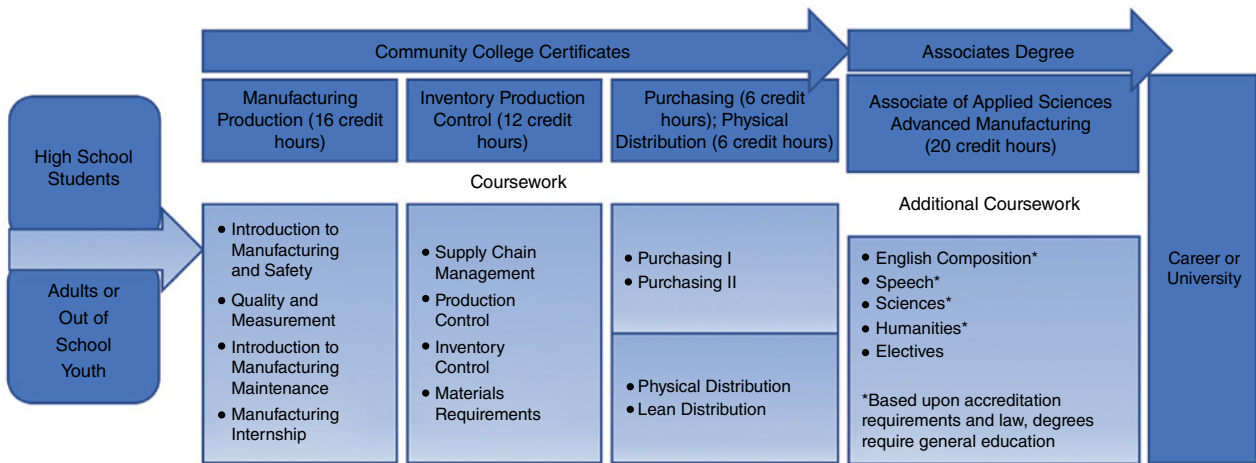
Figure 12.1 Career pathway example: An Associate of Applied Science degree in advanced manufacturing.

to pursue a manufacturing production certificate and then employment, he or she would obtain that credential and secure a job, but he or she would also have the option now or in the future to pursue an AAS degree in advanced manufacturing, along with four certificates attained along the way to the degree. This concept of stackable credentials is essential to understanding career pathways because it allows students to exit for a time (what is often called *stopping out*), to pursue employment and return at a later time to complete their studies and return to employment or continue on for more education. What is missing from Figure 12.1 is the inclusion of a strong supportive services element and embedded industry-recognized credentials that are increasingly recognized as important to students' qualifications.

Career Pathways in WIOA

In the WIOA legislation, career pathways are the chief mode by which workforce education and training are delivered to workforce training and education participants. The law states that career pathways should align with the needs of business and industry and prepare students for success in secondary and postsecondary education that is focused on organizing services (i.e., training, education, and supports) in an individualized manner that enables students to obtain a credential that leads to career advancement. This federal legislation also endorses apprenticeships and career counseling and suggests that both should be offered simultaneously with workforce preparation. It potentially represents a return to human capital theory that emphasizes the importance of investment in workforce education and training (Bird, Foster, & Ganzglass, 2014).

Challenges and Opportunities for CTE and Career Pathways

There is still substantial evidence that college remains the most promising pathway to the middle class and greater wage earnings, whether academic or CTE. In fact, even when considering socioeconomic differences, college enrollment produces a stronger return on investment than lesser levels of education (Belfield & Bailey, 2011; Carnevale et al., 2010). Of course, there are those who question its value, despite a large body of evidence to the contrary (see, e.g., Bennett & Wilezol, 2013). The POS a student takes is highly correlated to earnings. The credentials conferred by community colleges that produce the best returns are longer term certificates associated with technology, construction, or healthcare, whereas shorter term credentials associated with the service sector have much more limited economic payoff. In some instances, long-term credentials produce better earnings than associate degrees (Bosworth, 2010), and there is some evidence to suggest that earners associated with baccalaureate degrees in the liberal arts and sciences are surpassed by industry-recognized credentials in POS that require a high degree of technical specialization (Schneider, 2015).

At the same time, jobs are becoming more specialized, more computerized, and more tied to the attainment of a higher degree than ever (Carnevale et al., 2010). In this context, community colleges remain good options for meeting the demands of the changing workforce (Giguère, 2008). As a result, workforce development takes on an added importance in the mission of community colleges. Indeed,

under the Obama administration, the role of the community colleges as workforce development entities increased, resulting in more and more community colleges focusing on workforce development (Bragg, 2015). By implication, the workforce needs of business and industry exert more pressure on shaping CTE offerings, especially at the postsecondary level, where graduates are expected to enter the workforce at fairly high levels of career readiness. Although it is premature to judge the federal commitment to career pathways, the idea is taking shape in a major way in the USA. This is not without pitfalls, as trends in workforce development as well as higher education may also represent potential dangers for CTE. Among these concerns are dangers related to tracking, maintaining the open access mission of the community college, and the transactional nature of workforce training, a trend that has also affected the US higher education system. Each is discussed in turn.

Tracking

Federal CTE and WIOA policy share a history of focusing on disadvantaged populations, at least legislatively. In federal CTE policy, the focus on special population students sparked criticism of discrimination through tracking. Some have argued that CTE dampened student aspirations through a process known as "cooling out" (Clark, 1960), with students tracked into vocational courses and their aspirations tempered or squelched entirely (Dougherty, 2006). Through cooling out (by way of advising), students are diverted from their goal of continuing into 4-year institutions and are instead advised into vocational tracks, even though they may have benefited from continuing on the 4-year track. Typically, these students come from racial and ethnic or other demographic subgroups such as first-generation college students, working-class students, and others with limited cultural capital playing a part (Valadez, 1996). Conversely, workforce systems have been criticized for "creaming," that is, choosing students who will help workforce programs meet short-term goals rather than offering long-term benefits for students. It is possible these people may have done as well without the program as with it, but the risk is that these students were at least as (if not more) likely to negatively impact performance measures as improve them (Heckman, Heinrich, & Smith, 2002).

One area that could manifest in the recent and future implementation of CTE is the apprenticeship model (Lerman, 2013). In some other national vocational education and training (VET) systems, students compete for slots to participate in workforce training (Graf, 2015), whereas in the US system, WIOA requires that 75% of all funds must be spent on out-of-school youth, who are defined as 16–24-year-olds who have separated from or graduated from high school and who have some specific barriers (e.g., high school dropout, basic skills deficient, etc.), let alone college enrollment. However, to meet performance requirements, apprenticeship agreements forged through WIOA could limit access to students who have the most challenging educational, economic, and social circumstances. Given the dual role of the WIOA system, as both training provider and employer services, it is unclear whether the system will be able to focus on youth with significant barriers in the context of increasing performance accountability.

As these two systems come together, the role of CTE in serving historically underrepresented populations could become diluted by the creaming practices that have plagued workforce programs. Finding the right balance between appropriate advising of students into programs, assistance with their barriers, and meeting the accountability requirements of a reauthorized Perkins program will be important to avoid practices that unfairly discriminate against students.

The Open Access Mission of Community Colleges

The open access mission of community colleges is aimed at increasing social equality by increasing educational opportunity, serving students who are likely to struggle with access to college, and helping them secure employment that garners a living wage (Bailey & Morest, 2006). Considering the context of CTE in closer connection to workforce development policy, and the ways in which those policies may become integrated, the access mission of community colleges could suffer as CTE is connected more explicitly to the US workforce development system. Ironically, the focus on special populations that emerged in the 1970s and 1980s, together with a closer connection between CTE and workforce development policy and accountability systems that accompany both, may lead to a reduced focus on special populations as time moves on. Accountability systems, under the Workforce Investment Act (WIA) (WIOA's predecessor legislation) at least, limited rather than increased student access and choice to enroll in college (Shaw & Rab, 2003). If this pattern continues under WIOA, the USA could jeopardize access to community college education and the democratic agenda of these institutions. Add to this the federal focus on the college completion agenda begun under President Barack Obama (Bragg & Durham, 2012), and the concern about college access is heightened further. The fact that community colleges serve the greatest proportion of underserved student populations of all postsecondary education places these institutions in the spotlight when issues of access to academic and CTE curriculum emerge in the national dialog. It would be detrimental to the country if open access to community college CTE was restricted.

These limitations could also have implications for the integration of academic and technical education that now characterizes vocational education law in the USA as well. Historically, the dichotomous relationship between academic "transfer" disciplines and vocational/technical education is tied to higher education access and represents a fundamental disagreement on the broader purpose of higher education that has deep historic roots in this country. Through various iterations of Perkins, this divide has been somewhat bridged, in theory at least. However, as CTE becomes closer to workforce policy, and thereby more transactional, the student may be seen more as client or customer, and the divide may increase.

The Transactional Nature of Workforce Development Policy

The shifting of public education from a public good to a private benefit is particularly problematic for CTE curricula in the USA, where the goal is focused on conferring occupationally focused knowledge and skills that enable students to become employed, and which is arguably the most important public *and* private benefit procured from postsecondary education. This shift is reflected in reduced

state support and increased reliance on student tuition and fees, resulting in growing student loan debt that is causing some students to question whether higher education is a viable option (Phelan, 2014). Providing students with the skills they need for a job so that the economy will flourish is incredibly important. However, the public role of higher education institutions may be shrinking (Mathews, 2016), despite the aforementioned evidence affirming their value.

This shift to private benefit has led to the emergence of higher education as transactional in nature. That is, students see themselves less as a student and more as a customer, procuring goods and services that will make them marketable. Advocacy for this approach in higher education is certainly present, and the debate is not new (see, e.g., Delucchi & Korgen, 2002), but it seems to be growing. Indeed, some advocate strongly for a private-benefit approach (Bowden, 2011), whereas others prefer to view students as partners in educational endeavors (Clayson & Haley, 2005; Ferris, 2002).

As Frederickson (1996) has pointed out, a real danger exists in viewing government services as transactional. For example, with the Job Training Partnership Act (JTPA), which was based on human capital theory and preceded the WIA, reformers sought to make the workforce system rely more heavily on market forces, with a focus on accountability measures and the adoption of a customer service approach (Gore, 1993). This shift was made in many areas of government, including job training and education, away from the administrative paradigm of government to a more entrepreneurial paradigm, characterized by market mechanisms and an orientation toward outcomes (Moe, 1994; Moe & Gilmour, 1995). The entrepreneurial paradigm emanated from the work of Osborne and Gaebler (1992) and the National Performance Review (1993) of the Clinton–Gore administration, during which time WIA was passed.

Underlying the adoption of these business values is the faith that the free market will force self-interested participants into an equilibrium that equates to the achievement of "maximum achievable social good," implying that public interest can be achieved through self-interest (deLeon & Denhardt, 2000, p. 91). These free market forces, and the utilization of self-interest by the rational actors involved, occur even when regulatory conditions exist. This transactional approach implies a political viewpoint that is focused on short-term interests of individuals rather than on the public, or citizenry, writ large (deLeon & Denhardt, 2000).

Over time, these neoliberal ideals have begun to dominate the policies of the US government and, by extension, higher education as well (Harvey, 2005; Sanders, 2002). For example, revenue generation from private sources has become a priority for higher education (Slaughter & Rhoades, 2004). Efficiency considerations have led to an increase in reliance on adjunct faculty (Kezar, 2004), with students shifting away from the intrinsic rewards of higher education toward viewing it as a commodity (Wellen, 2005). Record deficits in states have accelerated this trend, forcing higher education institutions to generate more revenue, including shifting the cost burden to students (Zumeta, 2004). Community colleges are not immune from this influence, as they too have moved away from their civic responsibility agenda toward viewing students as consumers, alongside further service to corporations (Boyd, 2010).

As CTE becomes more closely tied to workforce training, it becomes more susceptible to the pressure exerted in the workforce arena, while also feeling pressures from the higher education sector. In essence, by ever-increasingly straddling two sectors, CTE faces dual pressures as it strives to train individuals for occupations. Balancing the dual roles of educating individuals for careers, alongside meeting the short-term training goals of the workforce system, could prove to be a daunting task for CTE going forward. However, the movement away from WIA back to a model based more on human capital theory under WIOA could mitigate these dual pressures, or it could precipitate training for short-term, low-wage occupations. This latter potential result is troubling, as the tendency in workforce programs has been to bring completers to the upper edges of poverty, rather than to the point of a living sustainable wage (Mangum, Mangum, & Sum, 1998). This is contrary to the goals of CTE.

One avenue that may prove important in this context is the emergence of the Applied Baccalaureate (AB) degree, which could strengthen the current system of certificates and degrees by creating a higher ceiling for career pathways. Currently, 24 states allow community colleges to offer the AB degree, with others in various stages of policy discussion. Through research on state policy, Ruud and Bragg (2011) found there were four main reasons that states pursue the AB degree. First, the degree enables students to transfer when they receive applied associate degrees from community colleges, while retaining most of their college credits. Second, the AB degree provides a way to improve baccalaureate completion for adult students, including those who are typically nontraditional and exhibit the barriers that this status entails—family limitations, place-bound, work requirements, and so on. Third, the AB degree provides a way for states to improve the rate of baccalaureate completion, which is important because accountability requirements are increasing in light of the national focus on completion. Finally, states use the AB degree to improve workforce education because the degree programs tend to focus on occupations that are in demand in local labor markets.

From this perspective, the AB degree represents a logical step to legitimizing CTE in an increasingly complex, technical world and fits well within the logic of a career pathway system while also providing a counterweight to the dual pressures facing both the workforce system and higher education, boosting college-going rates, and addressing increased postsecondary requirements of the workplace. Furthermore, AB degrees provide an important avenue for students who have historically seen themselves as baccalaureate-degree bound, including students of color, working mothers, nontraditional adult students, as well as those working in technical occupations who have not required baccalaureate credentials in the past.

The Promise of Career Pathways

In some sense, career pathways are an acknowledgment of the transactional nature of workforce development while also providing the promise of human capital development. If, however, career pathways fall prey to the urges of neoliberalism, consumerism, and anti-intellectualism, and focus on preparing students

to be "cogs in the wheel," as was embodied in the work-first approach to past workforce policy in the USA, then policymakers run the risk of creating an environment that does not attract students to participate. Adding to this the potential for creaming, whereby student access is restricted to demonstrate performance, the future of CTE is called into question. In this scenario, those students who community colleges have served more extensively than any other higher education sector, the students who higher education has underserved historically, stand to suffer the most (Bailey & Morest, 2006).

The promise of career pathways, if done thoughtfully, is that CTE is integral to a progression of education and training that leads to a living wage *and* provides opportunities beyond each level of credential and degree. The realities of implementation rarely look like the panacea that is offered by new concepts in changed legislation. The challenge for implementers is, therefore, to nurture connections needed to create career pathways. The potential investment in human capital captured in the connection of CTE to the emerging workforce policy under WIOA holds promise, but time will tell what materializes. The manifestation of career pathways in work-based learning, stackable credentials, and apprenticeships represents an important shift in focus toward increasing the profile, if not prestige, of CTE in the overall educational endeavor. The connection between workforce education and CTE may represent an enhancement to education that is long overdue, provided the pitfalls discussed in this chapter can be avoided.

Concluding Remarks

In an era where technical credential holders may potentially earn more than their counterparts holding a traditional baccalaureate degree or a high school diploma, preserving the mission of CTE has never been more important. The good news is that, in theory, the concept of career pathways is consistent with this mission. Indeed, workforce policy and CTE policy are more closely aligned than ever, and the direction embodied in a career pathway seems thus far to be a step in the right direction, with a movement away from damaging "work-first" policies that characterized the previous iteration of the federal workforce law. Nonetheless, there are some important considerations for all stakeholders to consider. We focus on three.

First, how are equity considerations going to be preserved and strengthened in this changing environment of career pathways? Equity considerations must be paramount. In the workforce system, where creaming is well-documented, where recruiters are unlikely to reject those who are eager to enter a program, and where employers are the ultimate determiners of program success, those who stand to benefit the most from CTE's close connection to equity face the potential of being screened out. In this context, the distinction between tracking students versus guiding them along a career pathway needs to be real. Providers and systems should be ever diligent to ensure the latter supersedes the former.

Second, how are stakeholders going to ensure that K–12 education is an important component of a career pathway system? The role of secondary CTE is potentially diminished in the context of this connection between postsecondary

CTE and workforce training. This is exactly the opposite of what a career pathway should do. Nonetheless, if the adoption of the career pathway definition in WIOA proceeds in the proposed Perkins V legislation, more focus will be placed on adult students, possibly at the expense of K–12 education. Now, WIOA legislation requires the majority (75%) of all funds be spent on out-of-school youth, limiting the focus on students enrolled in K–12 education. However, a robust career pathway system needs a strong secondary CTE system that prepares K–12 students to progress to the postsecondary level.

Third, how are states and community colleges adapting to this changing environment while maintaining their commitment to open access for students? Given the market-based nature of workforce development policy and the growth in neoliberal stances in higher education, *access issues* refer to more than just open admission policies. Cost considerations, location of students, and other factors contribute to conversations about access. A robust career pathway system that is seamless and provides opportunities for career progression should not vacate the discussion around access in the current outcome-oriented landscape. Despite the accountability measures and the completion environment that incentivize moving in this direction, access has been a priority to the CTE system—both K–12 and postsecondary. One could argue that before CTE emerged as a critical part of economic and workforce growth, it was about helping students find a skill and a purpose. That part of its essence must remain.

As this chapter was being written, Donald Trump was inaugurated as the 45th US President, bringing a national isolationist philosophy and a mandate to overturn conventional thinking and practice. What this means for the USA's many facets of vocational education remains to be seen. At this point, the Trump administration has articulated mostly nostalgic views based on his days in high school decades ago, despite his political stance to create jobs and put the nation's middle class back to work. President Trump has also questioned the purpose of community colleges, possibly for the purpose of distinguishing himself and his administration from the educational priorities set by President Obama, but these limited positions have not suggested an awareness of or support for career pathways. Rather, the current administration tends to harken back to President Reagan's market and deregulation orientation that privileged for-profit institutions. If these initial policy directions continue, higher education will see even more private influences and expansion to privatization, and community colleges may recede toward work-first training that runs counter to a career pathways approach.

Thus far, the across-the-board domestic program cuts advocated by President Trump have not materialized, although he continues to threaten domestic funding in favor of his political agenda that includes increased funding for defense, immigration restrictions, and so forth. Moreover, within the educational arena, Trump administration's has signaled reduced funding, including preliminary information on caps to graduate student loans, the restructuring of income-based repayment plans for loan holders, and changes to loan forgiveness programs, none of which would benefit traditional students, either in their college attendance or when paying off loans (Powell, 2017). It is also unclear how states will respond to these federal reforms, and to be sure, the most profound

implications may impact undocumented students and students of color in the politics of public education and workforce development.

What is clear is that the isolationist tendencies of this administration run counter to the way in which public education and workforce policy have been constructed and implemented over the past several decades. Even President Reagan's administration recognized an increasingly global knowledge-based economy, with a citizenry who needs to be trained to meet those needs. President Trump seems to see today's global economy, and all that it entails, as part of the problem he is trying to fix with policies drawn up decades ago. Implications are bound to be profound.

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The Future of Vocational Education in Canadian Secondary Schools

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Introduction

In Canada, vocational education programs are associated with lower status work, which is reflected in student aspirations. For example, less than 10% of the high school population pursues apprenticeship training in secondary schools. Although comprehensive schools have been the norm since the latter part of the twentieth century in Canada, a divide between academic and vocational pathways for youth persists. In the past 25 years, however, several trends have sparked policymakers' interest in promoting apprenticeship and other school-to-work programs. First, the shortage of workers in skilled trades has led to an outcry from employers. Second, new technologies are challenging traditional divisions of knowledge in education. Third, the high unemployment rate for youth without postsecondary education (PSE) credentials has prompted increased attention to work-based learning to ease youth transitions to the labor market.

Beyond Canada, policymakers have rekindled debates about the organization of vocational education in secondary schools and about what constitutes vocational knowledge (Canning, 2011; Jørgensen, 2015; Mjelde, 2008; see also Chapters 12 and 14, this volume). In Europe and the UK, some policymakers have expressed interest in making the education system more seamless or permeable to meet labor market demands for generic skills and to provide greater access to higher education. For example, in Scotland, Higher National Certificates (short-cycle vocational qualifications delivered mainly in colleges), first introduced in 1925, now play a key role in broadening access to degree programs (Raffe & Howieson, 2013). Similarly, schools in Norway introduced more flexible education structures in the early 1990s to ensure that all young people would achieve matriculation and/or a vocational qualification (Mjelde, 2004). These instances, among others, indicate that the dichotomy between vocational and academic learning is being questioned in new ways.

Curriculum reforms in Canadian provinces reflect concerns about the ability of "industrial age" curricula to prepare youth for future work. The discussion around these reforms recalls Brown and Lauder's (1992) argument in support of a post-Fordist approach to school reform focused on developing a broad-based interdisciplinary curriculum of academic, technical, and practical study. According to writers like Young (1998), a "connective curriculum" would challenge the distinction between high-status (academic) and low-status (vocational) knowledge with the aim of empowering youth to participate in all spheres of social life. At the same time, neoliberal forces aimed at marketizing and privatizing school systems present challenges.

This chapter traces the development of vocational education in Canadian schools from the late nineteenth century to the "new vocationalism" at the end of the twentieth. This historical discussion is valuable because it illustrates how we have arrived at the current situation, indicates the effects of external pressures on educational reforms over time, demonstrates the successes and failures of previous policies, and highlights changes in the context. This chapter therefore provides a case study from Canada that looks back in order to look forward. I argue that vocational education in Canada demands a more expansive view of vocationalism, more regulation of workplace learning, and more articulation across secondary and PSE programs.

In 1987, the Canadian Teachers' Federation defined *vocational education* as education directed toward teaching skills and knowledge that will help graduating students qualify for entry-level positions needed in occupations that do not require PSE (Smaller, 2003). Although a high school diploma is seen as a bare minimum for most jobs nowadays, this was not always the case. An examination of the development of technical and industrial education in Canada provides insights into how the current system came to be. It highlights that struggles over definitions, content, and teaching methods have long characterized vocational education (Coulter & Goodson, 1993). The rest of this chapter is divided into seven main sections. The next section focuses on the jurisdictional roles of provincial and federal governments in education and training over time, how the secondary school system in Canada developed historically, and how the aims of vocational education have been conceived.

Jurisdictional Tensions in the Governance of Education and Training

In Canada, education has been under provincial rather than federal jurisdiction since the 1867 Constitution Act gave provinces exclusive control over education and training. Sections 92 and 93 of the act protected the provincial power to certify vocational teachers and tradespeople, to regulate contracts of employment, and to legislate labor laws, and they provided provincial governments with exclusive constitutional responsibility for education (Lyons, Randhawa, & Paulson, 1991). Yet, despite this legislation, the federal government played a key role in the development of vocational education. For example, the lobby for vocational education at the outset of the twentieth century occurred at federal as well as provincial government levels, and the federal government played a key role

in developing technical education in public schools up until the 1960s primarily through incentive grants to provinces (Manzer, 1994). The Canadian Manufacturers' Association (CMA), formed in 1887, became the "primary lobby force pressuring the federal government to promote vocational education" by the turn of the twentieth century (Lyons et al., 1991, p. 140). Growth in manufacturing in what had been a predominantly agricultural society led to concerns about a lack of skilled labor. The Trades and Labour Congress and the Dominion Board of Trade supported the CMA in this lobby. Organized labor, although skeptical about claims of worker shortages, preferred the idea of technical education (defined as education founded on the theoretical principles underlying a trade) to manual training (defined as specific trades training) because it offered more possibilities for social mobility (Bullen, 1989).

Lobbyists for vocational education focused their activities at the federal level for the following reasons: (a) They saw industrial development as an economic aspect of nation building, (b) federal financing was the only adequate source of funding for major projects, and (c) the building of the railroad had already established federal–industry cooperation (Lyons et al., 1991). However, my exploration of this period suggests that local activities laid the groundwork for government intervention (Taylor, 1997). For example, in the late 1860s, prominent Torontonians formed an Industrial Schools Committee to petition municipal authorities and the provincial government to establish schools for street children to instill work norms and factory rules (Morrison, 1974). In 1891, a small group of municipal, educational, and industrial leaders established the Toronto Technical School with municipal funding (Stamp, 1972). Between 1900 and 1903, a tobacco millionaire established 21 manual training schools across the country to train teachers in how to instruct students in manual skills (Smaller, 2003; Williamson, 2004). During this period, local boards of trade also became involved in the campaign for technical education at provincial and national levels. Although by 1900 the CMA had taken the lead in the campaign for technical education, it appeared to be "the combined work of educators, industrialists and governments" that produced the comprehensive system of technical education adopted in Ontario and Canada (Stamp, 1972, p. 73).

Provincial legislation also responded to economic concerns. For instance, the Ontario Technical Education Act of 1897 allowed school trustees to establish technical schools or add technical schools to existing high schools. In 1910, federal Labour Minister Mackenzie King (who later became prime minister) was appointed to lead a Royal Commission on Industrial Training and Technical Education. Around the same time, Ontario passed the Industrial Education Act of 1911, based on the recommendations of Superintendent of Education John Seath in his report *Education for Industrial Purposes*. Seath's report examined how technical education was approached in the USA and Europe, and he proposed a framework for vocational education supported by provincial grants that included differentiated schools, governance of technical schools by an advisory committee (including educators, industry, and labor), and a teachers' college for training industrial teachers (Stamp, 1972).

The federal Technical Education Act in 1919 responded to Royal Commission recommendations by providing funding to underwrite the expansion of

provincial training systems and infrastructure. Under this act, the federal government allocated $10 million to the provinces over more than 10 years to promote technical education at the secondary school level (Manzer, 1994). The depression of the 1930s limited the development of vocational education in most of Canada, but in 1942, the federal government passed the Vocational Training Coordination Act, which made $30 million available for vocational secondary schools (Manzer, 1994). During World War II (WWII), the federal government took over technical education, and students were encouraged to complete technical education programs that served military needs (Allison, 2016). Although the federal government relinquished control over technical education after the war, it continued to direct its development.

The Vocational Schools Assistance Agreement (1945) provided federal, shared-cost assistance to create provincial composite high schools (cited in Lyons et al., 1991). Still, the 1957 Royal Commission on Canada's Economic Prospects noted that the country was not expanding its skilled workforce to meet the need for higher level skills (Bryce, 1970). The commission predicted that requirements for a skilled workforce would outpace supply, immigration could no longer be relied upon as the major source for skilled workers, and the most severe shortages would involve professional workers. It was believed that youth would be a good source of skilled and professional workers if adequate training facilities could be made available. Apprenticeship training and programs in technical and vocational schools were seen as ways of providing young people with the skills necessary to find employment in a technologically advanced society.

In 1960, the federal Technical and Vocational Training Assistance Act (TVTAA) was introduced to address skill demands and focused on both youth and adults. TVTAA was a significant direct intervention into secondary education as well as PSE, which went beyond the federal government's constitutional mandate (Fisher et al., 2006). For instance, by March 1969, the province of Alberta had accessed over $75 million under the TVTAA, much of which went into creating vocational education facilities in high schools (Williamson, 2004). Bell (2004) suggests that the act was introduced to counter resistance to vocational education in Canada, to address the need for new schools due to the postwar baby boom, and to respond to economic stagnation and rising unemployment in the late 1950s. The assumption was that human capital investment would spur industrial growth.

However, the federal government shifted its focus away from secondary education soon after:

> As abruptly as Ottawa had entered vocational training, it left—without consulting the provinces. At a federal-provincial conference in October 1966, the federal government announced it would withdraw from the field of vocational education to enter that of adult occupational training and retraining, and to increase its assistance to universities…. Distinguishing between short-term retraining, for which federal authorities should have responsibility, and long-term vocational preparation, a provincial matter, the federal government launched the Adult Occupational Training Act (1967). (Lyons et al., 1991, p. 143)

This withdrawal of the federal government was challenging for provinces and school boards that had grown dependent on federal funding for high school vocational programs. The federal government replaced the Adult Occupational Training Act (1967) with the National Training Act (1982), followed by the Canadian Jobs Strategy (1985) involving investments in training responsive to local labor markets (cited in Lyons et al., 1991).

In summary, the federal government's role in education and training has been unclear historically (Lyons et al., 1991). Some writers suggest constitutional tensions have inhibited the development of vocational education in Canada, especially in comparison to countries with strong national vocational education and training (VET) systems supported by corporatist structures. For example, although the federal government provided financial support for VET through the TVTAA, the requirement for provinces to match funding led to uneven implementation across the country (Lyons et al., 1991). Regional economic differences have also made the development of a national system more challenging. However, provincial jurisdiction has given rise to different systems of education, training, and certification across the country. In the next section, I examine the development of high schools in Canada and their relationship to vocational education.

The Development of High Schools

The elementary school sector was solidified under the School Act of 1850, and free schooling became more widespread (Curtis, Livingstone, & Smaller, 1992). Most students, however, still attended rural one-room schools, and it was only in the 1870s that elementary school grades and segregation of students by age began to occur. By the late 1880s, popular demand for education had led to selective, privately funded grammar schools becoming multipurpose secondary schools. Still, given the limited access to high school education for the majority of adolescents, they were described as "the vocational and pre-vocational school of the middle classes" (Gidney & Millar, 1990, p. 318). High schools of the late nineteenth and early twentieth centuries set entrance examinations and served as gatekeepers to most professions and prestigious white-collar occupations. Vocational programs were also highly gendered; for example, within commercial education, stenography and secretarial courses were aimed at young women, whereas general business and accounting courses were aimed at young men (Jackson & Gaskell, 1987). Trades-related technical and industrial programs were also targeted at young men.

With the campaign for industrial education beginning in the 1880s, public rhetoric began to focus on the irrelevance of academic secondary schools to a changing society. As noted, reformers campaigned for vocational education, with a focus on two distinct but related approaches (Manzer, 1994):

1) A system with separate vocational secondary schools and academic schools; and
2) Bilateral secondary schools offering general programs as an alternative to the traditional academic program.

John Seath's 1911 report recommended three types of Ontario secondary schools: general industrial schools, technical schools, and academic schools. The report of Canada's 1913 Royal Commission on Industrial Training and Technical Education also recommended the expansion of industrial training and technical education in high schools for manual industrial occupations, agriculture, housekeeping, and commercial and business occupations. Academic secondary education was to provide preparation for entry to professional occupations (Manzer, 1994).

The Toronto school board was probably most active in establishing separate high schools. Between 1918 and 1939, the district's technical and industrial day schools increased in number from 11 to 62 (Manzer, 1994, p. 100). Growth across the rest of the country was slower, partly because of smaller populations (only 14 Canadian cities had populations over 50,000 by 1943). Despite their increased prevalence, specialized technical and commercial high schools became stigmatized across the country as inferior to academic schools, and public resistance to vocational secondary schooling grew. For example, Manzer (1994) notes that, regardless of provincial regulations encouraging greater diversity of secondary school programs, most schools in the 1920s and 1930s offered only academic programs. During and after World War II, however, concerns were raised about the segregation of academic and vocational education and the domination of secondary schools by a narrow academic curriculum.

Gidney and Millar (1990) add that, in spite of growing interest from policymakers in vocational education:

> Technical education made only the slowest of inroads during the first half of the 20th century and any student who passed through the system before the 1960s will testify to the fact that progressivism had not yet run rampant in Ontario's secondary schools…the high school remained even as late as the mid 1950s a highly selective institution where the majority of students never proceeded beyond grade 10 and only a small minority reached grade 13. (pp. 318–319)

In the 1950s, over three quarters of students in Canada were enrolled in general or academic courses as opposed to commercial and technical courses. Royal commissions in three provinces by the end of the 1950s found that vocational programs were being neglected and were not meeting the needs of students with different abilities (Manzer, 1994). In an attempt to address this, composite schools with different levels of programming (academic, general, and vocational) became the hegemonic form of education in eight of 10 provinces in the 1960s. In the next section, I talk about developments since the 1960s characterized by new vocational discourse.

Preparing Youth for Work: Conceptions of Vocational Education

In the late nineteenth and early twentieth centuries, policymakers used a variety of terms to talk about vocational education: *manual training, technical education, industrial education*, and the broader term *vocational education*.

The Royal Commission on Industrial Training and Technical Education distinguished between *technical education*, seen as more theoretical in nature and directed toward those who would manage industries, and *industrial education*, which included a general education emphasizing more practical skills for students entering the trades (Allison, 2016). In Alberta, policymakers deployed different language to describe vocational education in different periods: *manual training* and *manual arts* (1900–1926), *technical education* (1913–1936), *technical electives* (1936–1944), *industrial arts* (1944–1969), and *industrial education* (1969–1983) (Mathew, 1984). In the 1980s, the term used was *practical arts*, followed by *career and technology studies* (CTS) in the 1990s (Williamson, 2004). No doubt, the move away from the language of industrial education reflected a broadening of vocational education curriculum over time as the economy shifted from manufacturing to service sector work.

Importantly, differences in terminology reveal shifting ideas about the breadth of the vocational education curriculum and its overlap with other education; different vocational programs were targeted at different groups of students. Manzer (1994) notes that as early as the 1920s and 1930s, "parents and students understood that the programs offered in both academic and vocational secondary schools were class-specific and class-defining and that economic opportunities were consistently superior for graduates of academic programs" (p. 102).

In Canada, debates around what kind of vocational education philosophy should guide reforms were evident (Taylor, 1997). Likewise, in the USA, debates were sparked by the vocational education movement of the early twentieth century (Wirth, 1974). On one side, "social efficiency" proponents like David Snedden and Charles Prosser believed that the task of education was to make the economy function more efficiently, that social inequality was inevitable, and that children should be fitted for their place in society (see Chapter 12). They were especially impressed by the dual system of education and training in Germany, and argued for a separate system of vocational education that would operate like a workplace and train students for employment by instilling habits of correct thinking and doing. On the other side, John Dewey advocated for a vocational education that would alter the existing industrial system rather than adapt workers to it (Drost, 1997). Dewey opposed the separation of trade education and general education because he thought that it would make both kinds of training narrower and less significant. Instead, Dewey proposed reorganizing traditional education to utilize the subject matter of the everyday environment. His aim was to combine democratic and humanistic values with science and industry. Thus, Dewey attempted to break down the antithesis of vocational and cultural education that was rooted in false oppositions of labor and leisure, theory and practice, and body and mind (Hager & Hyland, 2003; see also Chapter 3, this volume). These oppositions, however, are not easily dispelled. Such dichotomies date back to Plato and Aristotle (Rose, 2012), and continue to shape what counts as knowledge, who delivers it, and who certifies it (Hager & Hyland, 2003). For instance, in the UK, a view of vocational education as precisely *non-academic* and *non-theoretical* has resulted in successive governments regarding it as a pursuit for so-called less able, disaffected youth (Unwin, 2004).

Dewey's ideas were influential in Canada as well as the USA. For example, Christou (2012) suggests that the movement for progressive education had

become influential in all Canadian provinces by the 1930s. However, he adds that progressivist rhetoric in Ontario reflected opposing visions for reform depending on which aspects were emphasized (e.g., active learning or social justice). Progressivism in Ottawa schools in the 1920s and 1930s was described as a conservative movement; students were educated toward social conformity, and the learning was equated "with doing" (Wood, 1985, p. 194). The structures of schooling were unquestioned, as were norms of efficiency, intellectual testing, and expanded bureaucracy. Therefore, the extent to which progressive pedagogy, in the way Dewey envisioned, impacted classrooms and school systems in Canada is debatable. Curtis et al. (1992) suggest that the idea of the public school as a democratic force proposed by the New Education Movement in the early twentieth century and by educational Progressives of the 1960s was resisted by powerful elites. However, there were examples of promising initiatives; for example, the Flemingdon Road Community School Project in the 1960s in Ontario is described as a precursor to more recent ideas about schools as hubs for multiservice delivery related to community education and development (Shuttleworth, 2014).

Several important messages emerge from the historical discussion here. First, when the workplace is reconfigured, vocational education is necessarily affected given its close links to local labor markets (Coulter & Goodson, 1993). Second, a variety of players with different interests and visions for vocational education have participated in the lobby for industrial education in Canada. Vocational education has been a site of struggle over how work is conceived, what kind of knowledge is considered valuable, and how such knowledge should be taught. Gaskell (1993) suggests that the classroom may provide the most viable space for counterhegemonic vocational education. Third, as a number of writers note, popular support for education is important (Livingstone, 1994). The slow inroads made by technical education in the first half of the twentieth century can be attributed, in part, to the lack of confidence of students and parents in the ability of vocational programs to adequately prepare youth for employment or adulthood (see also Coulter, 1993). The next section discusses the extent to which what has become known as *new vocationalism* has addressed some of the historical tensions.

New Vocationalism, Unified Curriculum, and Hybrid Qualifications

The discourse of *new vocationalism*, which arose in the 1970s in many OECD countries, addressed the criticism that vocational education was too narrowly focused on practical skills and capacities that quickly become obsolete. There was further concern about the inequity of schooling approaches that promote rote learning and narrow vocational training for some students and more flexible, creative learning for others (Hickox, 1995). Proponents of new vocationalism supported more inclusive and general workforce preparation that would integrate academic and vocational learning (Benson, 1997; Bills, 2009; Young, 1998). They advocated a vocational education that was broader, better integrated with

academic content, and more critical of workplace practices (Grubb, 1996; Sedunary, 1996). This section explores the changing economic context in Canada, corresponding changes in secondary education, and the extent to which these changes reflect the discourse of new vocationalism.

The late twentieth century saw economic changes associated with the emergence of a post-industrial society in many parts of the world (Bell, 1973). Key economic trends in Canada included the shift from a manufacturing to a service economy, increase in nonstandard work forms, and liberalization of trade (Taylor, 2016). The proportion of service sector workers grew from less than half of employed Canadians in 1951 to more than three quarters in 2008, with almost one quarter employed in lower tier services (Krahn, Lowe, & Hughes, 2011). Nonstandard work, including part-time work, contract work, self-employment, and multiple job holding, has accounted for about one third of jobs since the late 1980s as employers have sought to increase their flexibility and reduce labor costs (Krahn et al., 2011). However, this shifting job market has significant consequences for workers. Nonstandard forms of work offer less job security, lower pay, and fewer benefits (which impacts long-term earnings), and precarious workers report more stress and tension at work. Concern has grown about rising unemployment rates for youth who drop out of high school but also the underemployment experienced by many university graduates who find themselves working in so-called McJobs. Policymakers refer to NEETs (youth "not in employment, education, or training") and, more recently, PINEs (poorly integrated new entrants) (Bell & Benes, 2012).

At the same time, there has been a decline in the power of organized labor (Ore, 2012). Globalization has involved the pursuit of numerous trade agreements, starting with the 1988 Canada–US Free Trade Agreement. Whereas supporters of trade liberalization argue that such policies benefit all parties, organized labor often focuses on downward harmonization of labor laws and policies—a "race to the bottom" for workers. Therefore, youth today face a radically different set of labor market conditions than their parents did.

Within this globalized context, education has been seen as a key policy lever for industrial development and increased competitiveness (Maton, 2005). But struggles over the content, organization, and delivery of curriculum continue to be evident, as will now be illustrated through a discussion of developments in two Canadian provinces: first Ontario, and then Alberta.

Ontario

The passage of the TVTAA in 1960 followed by the 1962 Robarts Plan impacted Ontario schools in significant ways. Education Minister John Robarts reformed the secondary school curriculum to permit the streaming of students into technical/vocational programs, resulting in the construction of 335 new schools and additions to 83 existing schools, all dedicated to technical and vocational education (Smaller, 2003). Between 1961 and 1966, the percentage of high school students enrolled in non-academic programs increased from 24% to 46% of the total school population. The Robarts Plan divided the Ontario secondary school curriculum into Arts and Science, Business and Commerce, and Science,

Technology and Trades. Strands were offered as either a 5-year program leading to university or a 4-year program leading to newly created community colleges. In addition, a Diversified Occupations Program was offered in special schools to address the needs of students likely to leave school at age 16 with a Certificate of Training (Freeman, 2007).

It is not accidental that most vocational schools in Toronto were built in working-class and immigrant neighborhoods, because these students were more likely to be streamed into technical and vocational programs (Smaller, 2003). One concern with program streaming arose from the poor outcomes associated with vocational programs (Karp, 1988). By the end of the 1960s, these programs were perceived as "dumping grounds" for lower achieving students in preparation for insecure, low-paying jobs (Lazerson & Dunn, 1977, p. 291). In response to this perception, the 1968 Hall-Dennis Report advocated for a fully comprehensive public education curriculum, with specific vocational training to be left to postsecondary institutions (Manzer, 1994). Comprehensive schools were to provide broad opportunities for academic, general, and vocational education, with a credit system allowing for individual timetables and subject-by-subject promotion. Thus, comprehensive education became the dominant ideal of policymakers in the late 1960s and early 1970s.

But in the 1970s, a crisis in the world capitalist economy re-ignited fears about global competitiveness, and neoliberal policy approaches became popular in several industrialized countries, including Canada. Business organizations also began to take a renewed interest in the role of education in preparing young people for work. The 1970s and 1980s saw the development of a "back-to-basics" movement, which attacked the principles and practices of comprehensive secondary education. Accordingly, provincial governments began to revert back to earlier models that involved increased requirements for high school graduation, a system of provincial exams, and streaming of students (Gaskell, 1992). However, perceptions of vocational education remained negative, and students resisted such streaming, so enrollments in technology courses continued to fall between 1973 and 1996 (Smaller, 2003).

The *Radwanski Report* (1987) in Ontario reinforced the idea that education was the main determinant of collective and individual economic well-being, although opinions were divided about the timing of streaming. Whereas the *Radwanski Report* recommended a common curriculum, the 1995 *Report of a Royal Commission on Learning* (RCL) recommended de-streaming from grades 1 to 9 (ages 6–15) and specialization in grades 10 to 12 (ages 16–18). Other RCL recommendations included providing a course stream designed for university preparation and the other, of equal quality, emphasizing applications and connections outside the classroom (Gidney, 1999).

Beginning in 1996, Ontario's Conservative government introduced changes in curriculum, funding, and the governance of schools. Students in grades 9 and 10 could take academic or applied streams of courses, and grade 11 and 12 students could take workplace, college, university/college, or university "destination" courses. Curricula were developed in consultation with universities, colleges, and businesses to ensure students would be better prepared for

PSE and the world of work (Kitigawa, 1998). However, failure rates were high in applied courses, and technology credits made up only around 9% of all secondary school credits earned in 2004–2005 (King, 2004). The province also required all school districts to provide school-to-work transition (SWT) programs for students intending to enter the workplace after high school.

In 1999, the Government of Ontario established a Partnership Council with private and public sector representation to ensure that high school students had the opportunity to participate in relevant experiences that would support their academic achievement, career development, and future success. The same year, the Ontario Business Education Partnership (OBEP) was established as a not-for-profit organization to engage employers with schools and advocate on key issues impacting youth career exploration and workforce development (Taylor, 2005).

Upon their election in 2003, the Liberal government continued its predecessors' efforts to tighten links between schools and PSE institutions and employers. The Ministry of Education and Ministry of Training, Colleges, and Universities began to fund vocational programs, including the Ontario Youth Apprenticeship Program (OYAP), School-College Work Initiative (SCWI), and Specialist High Skills Major program (SHSM) (Taylor, 2009). OYAP allows high school students who are at least 16 years of age to gain on-the-job experience in a skilled trade while earning cooperative education credits toward the completion of their high school diploma. Students work with school coordinators to find a sponsoring employer and can register as apprentices. A small proportion of students complete the first level of in-class technical training while in high school, but the majority participate in on-the-job training only. An evaluation published in 2005 suggested that less than 5% of high school students were participating in OYAP, and male participation was more than double female participation (King, Warren, Boyer, & Chin, 2005).

The aim of the SCWI was to build province-wide articulation between secondary schools and community colleges to clarify pathways for youth and encourage more students to select college as their first choice for postsecondary study. SCWI activities include aligning curricula between secondary schools and colleges to develop seamless transitions (Taylor, 2007). Like programs in the USA (Hoffman, Vargas, Venezia, & Miller, 2007), SCWI's goal and priority has been to expand student participation in *dual credit* projects to all school boards and colleges, with many of these projects related to apprenticeship training. Dual credit courses involve a college credit course that is team-taught by a secondary school teacher, a college teacher, or a certified journeyperson. The implementation of SCWI reflects the growing interest in K–14 education in Canada and the USA as a way to increase high school graduation rates, PSE preparedness, and college retention and graduation rates.

The SHSM initiative, modeled loosely on "career academies" in the USA, was part of a Student Success Strategy introduced by the provincial government in 2003–2004 to improve high school graduation rates (Ontario Ministry of Education, 2003). SHSM "bundles" student courses to match apprenticeship, other PSE, or workplace learning requirements in particular industry sectors, and it promotes school–business and community partnerships (Taylor, 2007).

The Student Success Strategy also increased the school-leaving age to 18 to keep youth in school while recognizing alternative forms of learning.

These initiatives collectively reflect an interest in valuing and promoting non-university pathways for students. However, my research into high school apprenticeship programs revealed tensions between new vocational ideas and the persistent idea that vocational learning is aimed at preparing disaffected young people for the workplace (Taylor, 2005, 2010). In particular, the Government of Ontario's (2003) "pathways to success" recommended that SWT programs target students who were having difficulty meeting diploma requirements, who were disengaged, and who were seen as destined for work directly after secondary school. The perception that apprenticeship is for the so-called less able students was also pervasive in my research into high school apprenticeship programs in Ontario and Alberta (Taylor, 2010).

It can be seen, therefore, that Ontario's reforms were driven by the idea that education needs to be retooled to help students make appropriate career decisions while addressing employer needs for an educated, skilled labor force. However, in reality, programs like youth apprenticeship continue to be constructed as programs for youth "at risk," and the school curriculum overall has been unaffected by new initiatives. Furthermore, youth aspirations continue to be very high (Krahn & Taylor, 2005). Most importantly, education pathways continue to differ in terms of the advantage they are perceived to provide in the competition for jobs, income, social standing, and prestige.

Alberta

Like Ontario, there have been ongoing debates since the 1960s in Alberta about secondary school programs. For example, whereas the *Worth Report* (Commission on Educational Planning, 1972) reflected the 1960s shift toward student-centered inquiry learning, options, and open classrooms, the *Harder Report* (Curriculum Policies Board, 1977) was consistent with a "back-to-basics" approach and less program flexibility (Mazurek, 1999). *Worth* recommended integrating occupational placements into secondary schools (Ritter, 1978), whereas *Harder* recommended students take a minimum number of junior and senior high school credits in the practical arts (industrial education, home economics, business education, or work experience).

The 1984 *Review of Secondary Programs* also stated that secondary education should "provide the initial stages of career preparation by developing basic work skills, with an emphasis on fostering appropriate attitudes and awareness of the world of work" and mandated courses in practical arts and business (Alberta Education, 1984, p. 5). In the late 1980s, the Integrated Occupational Program (IOP) was introduced for students aged 12–19 years, who were considered at risk of not graduating from high school. Like the Diversified Occupations Program in Ontario, IOP was a separate path leading to a certificate requiring fewer credits than a high school diploma (Alberta Education, 1998). Half of those credits were to be occupational courses, designed to provide concrete learning experiences. However, over time, concerns emerged that the program was inflexible and outcomes for students were poor.

The 1984 review laid the groundwork for the 1988 *Practical Arts Review*, which aimed to update old courses and develop new ones in order to prepare students to enter the workforce "with the skills, knowledge and attitudes needed to help to ensure Alberta a competitive place within the global trading community" (Curriculum Development Branch, 1989, p. 4). It focused on junior and senior high school courses in home economics, business education, industrial education, personal development, and work experience education. Declining enrollments in "practical arts" were to be addressed by the integration of technology into courses, as reflected by the new name, CTS. A *new vocational* discourse was emerging (Lehmann & Taylor, 2003).

Alberta policy documents continued to highlight the importance of work education to economic prosperity in the 1990s. The new CTS curriculum was to provide students with "a combination of academic and practical skills as preparation for future study and careers in highly skilled and technical fields" (Alberta Education, 1994, p. 10). Business would be "a key player in defining the specific learning requirements of industry" (Alberta Education, 1994, p. 6). Schools would be accountable for students' achievement of provincial learning standards, "including employability skills consistent with workplace requirements" (Alberta Education, 1994, p. 5). The *Framework for Enhancing Business Involvement* (Alberta Education, 1996) recommended creating a Career Education Foundation to (a) promote business–education partnerships and apprenticeships; (b) enhance the image of trade, service, and technical careers; (c) review school programs and standards to ensure greater attention to employability and entrepreneurship; (d) review diploma requirements with emphasis on CTS requirements; and (e) involve business and employers more in policymaking at all levels (Taylor, 2002).

Alberta experimented with the idea of "Tech Prep" programs, based on US models and similar to Ontario's SCWI. Introduced in central Alberta in 1995, these programs included school-based learning, a work-based component, and connecting activities. Connecting activities focused on developing students' competencies in broadly defined occupational strands, teaching high school subjects in an applied way, linking high school and college curricula through articulation agreements, and providing opportunities for workplace learning. These programs failed to gain traction across the province, but in May 2013, the Alberta government announced funding to support dual credit programming in schools (O'Donnell, 2013). The dual credit strategy aims to make pathways from high school to college and careers more transparent. Like Ontario's SCWI, Alberta's dual credit allows a high school student to take a high school or PSE course and earn both high school credits and postsecondary credits. Dual credit is a form of hybrid qualification because it attempts to blur the lines for students between academic and vocational pathways. The student is registered in the articulated course in both institutions. At the time of the Tech Prep funding announcement, courses had already been developed with nine PSE institutions, including Alberta's two technical institutes. Key actions include engaging more youth by assisting colleges, schools, and employers to expand or create, deliver, and implement dual credit programming in their communities. In the next section, I consider whether reforms are consistent with new vocationalism.

New Vocationalism in Canadian Schools?

International pressures for unification have included demand for new types and higher levels of skills and knowledge, along with greater mobility and uncertainty in labor markets, attempts to address the low status of vocational education programs, and rising aspirations of youth. However, education systems are at different places; some are described as *tracked* (e.g., Germany's dual system, and England), others described as *linked* (there are tracks, but with parity and transfer) (most other European countries), and still others as *unified* (no tracks) (Sweden, New Zealand, and Scotland) (Raffe, Howieson, Spours, & Young, 1998). In Canada, concerns about equity of student outcomes and efforts to bring parity of esteem to vocational pathways have been evident since the early 1970s, partly as a response to the diminished work opportunities for youth who do not complete high school. The curriculum in Canadian schools can be described as unified or linked because (a) the majority of students work toward a common diploma, although streaming by course influences their PSE options; and (b) initiatives like Tech Prep and dual credit aim to bridge the gap between academic and vocational curricula and encourage more students to consider PSE.

However, the lack of a national education and training strategy has been linked to skills mismatch and persistently high unemployment rates. The question of streaming also continues to be controversial. For example, an Alberta government report, *Removing Barriers to High-school Completion*, acknowledged the stigmatization of lower tracks (Alberta Learning, 2001). In Ontario, the social democratic government de-streamed grade 9 around 1990, but the incoming Conservatives reintroduced the differentiation of high school streams. Streams, moreover, continue to perpetuate existing inequalities as they are linked to parents' education (Taylor & Krahn, 2009); for example, parents of high school apprentices have lower than average levels of education (Taylor, Lehmann, Raykov, & Hamm, 2013).

An additional concern is that programs like high school apprenticeship usually operate as an "add-on" to a student's secondary school program rather than being integrated into their academic program. Students often engage in on-the-job training for blocks of time with few formal opportunities to make connections between workplace learning and academic courses (Lehmann & Taylor, 2003). And although governments seem reluctant to invest in the integration of academic and vocational curriculum (e.g., Tech Prep in Alberta), their promotion of quasi-markets in schooling has increased the stratification of school offerings. A study in Edmonton, Alberta, for example, found significant differences across schools in the kind of credits earned by students ("vocational" or "university prep") (Taylor, 2006). Furthermore, although school leaders aspired to offer strong academic programs (such as the International Baccalaureate), few aspired to offer strong apprenticeship programs.

The implications of the shift over time from school-based to workplace-based vocational education in Ontario and Alberta are worth consideration. In his discussion of VET in Denmark, Jørgensen (2015) suggests that school-based VET has the advantage of allowing students' learning to be organized according to their needs rather than being subject to the requirements of production and economic interests of the training company. Furthermore, teachers in

school-based VET can be more socially inclusive than training companies (e.g., encouraging young women to explore nontraditional occupations). Finally, school-based VET is less dependent on business cycles, which influence the number of training placements offered by companies. On the flip side, workplace-based vocational education occurs in a "real-world" context rather than a simulated one, and may work well if it is sufficiently regulated. In the next section, I discuss the implications of the preceding discussion for future developments in vocational education.

Challenges and Promising Approaches in Secondary School Reform

The preceding discussion suggests that debates over the meaning of vocationalism have been occurring for over a century (see also Skillbeck, Connell, Lowe, & Tait, 1994). Although secondary school reforms in Canada reflect a "new vocationalism" in some respects, the legacy of "old vocationalism" is evident in the targeting of at-risk youth for apprenticeship programs and the lack of integration of classroom and workplace-based learning in these programs (Taylor, 2016). The market approach to education and emphasis on school rankings also reinforce the divide between academic and vocational programming, which in turn reinforces divisions of gender, class, and ethnicity (Mjelde, 2004; Taylor, 2006). Furthermore, the market approach to vocational education programs encourages a focus on short-term employability and workplace experiences for students that are of variable quality (Jackson, 1995; Mjelde, 2008; Taylor & Watt-Malcolm, 2007).

In this section, I return to writings that inform new vocationalism, including the work of John Dewey and recent philosophical discussions (Canning, 2011; Hager & Hyland, 2003; McGrath, 2012), in order to articulate ideas that could inform future secondary school reforms aimed at preparing youth for their futures, including work. I then provide recommendations based on the overall discussion. In his discussion of the continuing influence of John Dewey's ideas about education, Pring (2007) writes,

> [According to Dewey,] schools therefore should be communities that welcome the experiences young people bring to the school, respect each person's attempt to articulate those experiences, challenge those experiences with other interpretations, develop the capacity to inquire further as a result of these experiences, feed into such inquiries the wisdom of past and present people found in books and artifacts of many sorts (art objects, for instance), and prepare them for facing new experiences and managing their lives in the future. In that broad sense of preparation, all education is vocational. (p. 165)

From Dewey's perspective, choosing and being prepared for an economic role are part of students' learning. However, the end to be pursued is not simply passing examinations or getting a job but rather learning to make sense of their

worlds, being open to further inquiry and understanding, and becoming part of a community of people similarly seeking to improve their understanding and ability to work together (Pring, 2007). Dewey thus presents a broader and more holistic view of education and vocation.

But although the dichotomy between academic and vocational knowledge is problematic, it is important to recognize the distinctiveness of vocational knowledge. Drawing on the work of Wittgenstein, Canning (2011) notes that work-based knowledge is different from other knowledge in that it extends to sensorial, emotive, spatial, and somatic domains of knowing; vocational learning is material, embodied, and often tacit. Comparing informal workplace learning and formal classroom learning, Hager and Hyland (2003) suggest that informal learning is more open to the emotive, cognitive, and social dimensions of workers' experiences. They describe it as highly contextualized, less predictable, less structured, more self-directed, and more collaborative than formal classroom learning. Most importantly, these authors see the historical subjugation of vocational knowledge as problematic, and they advocate for a rich and deep vocational learning.

In Dewey's conception, educators need to consider the past experiences and capacities of students, include students in defining learning problems, and provide the conditions that arouse in students "the active quest for information and for production of new ideas" (Dewey, 1938, p. 79). Beyond training for paid employment, Dewey's vocationalism can be seen as a philosophy of purposive activity designed to accomplish results and render service—a dimension of education for living (Dewey, 1916, cited in Skillbeck et al., 1994). However, in practice, VET is often based on a restricted and instrumental view of life worlds, which reduces people and the environment to the status of human and natural resources for economic exploitation (Anderson, 2009, cited in McGrath, 2012). Anderson (2009) reminds us that students are also human beings and citizens with a wide range of needs, relationships, duties, aspirations, and interests beyond work—in the family, the local community, civil society, and the global environment. Attention to the moral and social aspects of vocational learning highlights its civic and liberal aspects (Winch, 2006, cited in McGrath, 2012).

Toward a more expansive view of VET, McGrath (2012) suggests adopting a human development and capabilities approach: "by linking justice, agency and well-being, it allows for a wider and more person-centered theory and practice of learnings-for-lives" (p. 630). Similarly, Hager and Hyland (2003) suggest locating VET within a framework of communitarian and public service values. One way of doing this might be to focus on school–community partnerships rather than school–business partnerships as a way of providing opportunities for student learning that involves action-oriented, collaborative, real-world problem solving (Benson, Harkavy, & Puckett, 2007).

Conclusion and Recommendations

In this final section, I draw on my previous discussion of the history of vocational education, the current political and economic context, and principles for expansive VET. My aim is a match between the logic of proposed reforms and those of

the education system, labor market, and social context (Raffe & Howieson, 2013). First, I propose three recommendations.

1) *Support the articulation of school–college and college–university vocational programs.* The PSE attainment of Canadian youth is among the highest of OECD countries. But there are growing concerns about jobs–qualifications mismatch, partly because schools tend to prioritize university preparation over preparation for apprenticeship or other vocational pathways. Attention to dual credit initiatives, which encourage students to enroll in college programs and help integrate college classroom learning with on-the-job apprenticeship training for high school students, is promising. At the same time, more work is needed to articulate apprenticeship training with university programs (Gunderson, 2009; Taylor, Watt-Malcolm, & Wimmer, 2013).

2) *Increase the regulation of work-based learning programs.* My research found that Canadian high school apprentices, like the apprentices in Mjelde's (2008) study in Norway, preferred learning in the workplace to sitting at a desk in formal classrooms (Taylor, 2016). But, as with Norwegian apprentices, this does not mean their workplace learning was unproblematic. Rather, it was often restrictive (Fuller & Unwin, 2006) in the sense that access to learning was limited, there were few opportunities for reflection, and apprentices were expected to become productive employees quickly. Disconnect between schools and workplaces and lack of strong regulatory mechanisms also meant that students experiencing problems had little recourse. Youth lacking familiarity with trades were particularly vulnerable to exploitation and were less likely to complete their training (Lehmann & Taylor, 2015). Canadian education systems could learn from other countries with more regulation of apprenticeship. For example, changes introduced in Norway in the 1980s included expectations that training within the firm would be planned, structured, and evaluated; the introduction of mentor schemes; and legitimization of cooperation between vocational teachers and employers, and between the vocational fields within the schools (Mjelde, 2008).

3) *Work toward community partnerships to promote a broader vocationalism.* Curriculum reforms underway in a couple of provinces appear to support an expanded vocationalism. Alberta Education charted a new course away from the old industrial schooling model toward a more learner-centered and competency-based system with its *Inspiring Education* report in 2010. The 3 R's (reading, writing, and arithmetic) are replaced with the 3 E's: producing engaged, ethical, and entrepreneurial citizens. Key features include interdisciplinary learning based on inquiry and discovery and experiential learning facilitated by including the community as a partner. Similarly, the province of British Columbia asserted that "our education system is based on a model of learning from another century" (BC Ministry of Education, 2011). Again, policymakers perceive the direction forward as involving more learner-centered education that links students' experiences at school with experiences and learning in their everyday lives. An aim is greater flexibility in how, when, and where learning takes place and more emphasis on key competencies.

Although in the early stages, these curriculum reforms appear to be moving in a direction consistent with ideas around unified curriculum and hybrid qualifications in the UK and Europe, and they respond to the calls for broader skills demanded by a knowledge-based economy. I include them here as promising directions for education, with a couple of caveats. First, the ability of schools to effectively meet the needs of diverse learners (including students with disabilities, English language learners, racialized students, and working-class students) has long been constrained by policies that encourage competition, stream students in limiting ways, and fail to provide the necessary resources to promote success. Introducing a more flexible education system without addressing the failures of the past is unlikely to work. Second, the focus of recent educational policies has privileged certain groups. As noted in this chapter, SWT programs in Ontario and Alberta have sought to develop partnerships with private sector employers despite evidence that such employers have been traditionally unwilling to provide training or to collaborate on training (Goldenberg, 2006). An expansive view of vocationalism suggests the need for more emphasis on partnerships with the community, broadly defined.

There are models of such partnerships with community schools. For example, Rosenstock and Steinberg (1999) describe the democratic culture at Rindge School of Technical Arts in Cambridge, Massachusetts, and the use of community projects to integrate vocational and academic knowledge. Similarly, extending Dewey's ideas, Benson et al. (2007) express a vision for public schools that function as "strategic centres of broadly based partnerships":

> The neighbourhood school can function as the core institution which provides comprehensive services, galvanizes other community institutions and groups, helps solve the problems communities confront in a rapidly changing world, and actively constructs the 'organic' society Dewey envisioned in 1888. (p. 86)

The recommendations given here address some of the issues identified in my previous research on high school apprentices in two provinces, which are rooted in the legacy of vocational education and market approaches to VET. I believe school–community partnerships, adequately resourced by governments, have the potential to promote an expansive vocationalism with social justice aims (Avis, 2016). Specifically, such partnerships could engage students in interdisciplinary, collaborative project-based learning. My recent experience as director of Community Service Learning at a Canadian university suggests that university students, like high school apprentices, want their learning to make a difference. But, as Dewey suggested so long ago, all experiences are not educative, and the challenge for educators is to do what they can to establish the experiential learning conditions most likely to promote student growth. These conditions involve including students along with community partners in the identification of problems, ensuring projects are within the capacity of students, and ensuring that they spark the active quest for knowledge (Dewey, 1938). Ideally, such an approach will enable students to learn how to effectively participate in determining the practices that define their lives in the workplace and in society.

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14

The Interrelation of General Education and VET: Understandings, Functions, and Pedagogy

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Introduction

This chapter examines the interrelation of general education and vocational education and training (VET), particularly focusing on the understandings and functions of general education and the pedagogy of relating general and vocational learning. The interrelation of general education or academic education and VET is a recurrent topic (see also Chapters 12 and 13, this volume). Young, Spurs, Howieson, and Raffe, (1997) distinguish between three kinds of relationship between academic and vocational learning: (a) a "tracked" approach in which academic and vocational learning are provided in separate systems, (b) a "linked" approach in which there are explicit links between the two, and (c) a "unified" approach in which there are no separate tracks for academic and vocational learning. Although these forms of organization refer to the system level, it captures a general and continuous issue in relation to general or academic learning and vocational learning, respectively: How should they be related? This issue is reflected in the regulations for and content of VET programs in different countries in relation to both curricula and pedagogy.

In VET, the current use of *competence* in relation to learning outcome descriptions entails a focus on both general knowledge and vocational knowledge, while also potentially restricting the width of that knowledge to that which is necessary to perform competently (see Wheelahan, this volume). However, the function of general subjects should not only be perceived in relation to the current needs for competences. General subjects have gained an important place in VET curricula alongside the rapidly changing needs for qualifications, caused by the development of a knowledge society and an increasing service sector (Wallenborn & Heyneman, 2009), and due to the fact that the workforce should be prepared for and able to participate in a lifelong development of relevant knowledge, skills, and competences. As an example of how the rapid development

influences the understanding of the relevant general subjects, the European Commission's list of key competences, which were formulated in 2006, have currently to be reviewed and updated, the focus being on reading, writing, and numeracy skills as well as on digital and entrepreneurial skills (European Commission, 2016).

Issues about general subjects in VET are intrinsic to debates about the content of VET programs. It is argued that VET programs should be subject-based and include so-called *powerful knowledge* and access to knowledge that goes beyond strictly work-related knowledge (Gamble, 2014; Hordern, 2015; Wheelahan, 2015; Young, 2014). Part of the advocacy for subject-based knowledge involves a critique of workplace-based learning for being truncated, instrumental, and based on what employers perceive as relevant. Instead, wider disciplinary and subject-based knowledge is needed in VET in order to develop "powerful and transformative knowledges" (Avis, 2014, p. 51).

General subjects differ from vocational subjects in the sense that the former originate in science and aim at developing and communicating theoretical knowledge, whereas vocational subjects connect with work life and the division of labor among various occupations (Jørgensen, 2012). Accordingly, the distinction between general subjects and vocational subjects can be associated with a number of other distinctions, such as (a) the distinction between academic subjects and practical knowledge, between "knowing how" (procedural knowledge) and "knowing that" (declarative knowledge) (Young, 2014); and (b) the distinction between abstract context-independent knowledge, which is academic, and context-dependent knowledge, which is "everyday" knowledge based on experiences (Rata, 2016). In Bernstein's (1999) terms, this distinction is conceptualized as the vertical discourse (academic knowledge) and the horizontal discourse (everyday knowledge). Furthermore, the distinction between school-based learning and workplace-based learning is also associated with the interrelation of general subjects and vocational subjects, even though the theoretical part of the vocational subjects will typically belong within school-based education. The affinities and associations with the various pairs of concepts point to an important issue in relation to the inclusion of general subjects in VET. General subjects represent forms of knowledge and learning that are regarded as peripheral or even foreign to the core understanding of the apprenticeship-style learning taking place in workplaces.

Concerning the understanding and definition of general subjects and vocational subjects, in a comparative study of VET in the Nordic countries (Denmark, Finland, Norway, and Sweden), the subcomponents of a VET qualification are conceptualized as "occupational orientation" and "higher education eligibility," and subsequently divided into four kinds of subject matters: (a) specific vocational subject matter, (b) wide vocational subject matter, (c) "higher education eligibility" subject matter, and (d) general subject matter (Kap, 2014). The comparison shows that in all four countries, VET includes both an occupational orientation and higher education eligibility. However, the organization of these two tracks differs across the countries. The study highlights two important issues in relation to general subjects and vocational subjects in VET. First, regarding the location of the different kinds of subjects in the programs, the typical organization

is that the proportion of general subjects is larger in the beginning part of the programs, which then gradually lead to a vocational specialization. Second, the degree of integration of the general subjects and vocational subjects varies, but the trend is toward greater integration (Kap, 2014).

A final issue in relation to general education in VET concerns pedagogy. The central pedagogical challenges are to motivate students with regard to studying general subjects and to ensure that students obtain general knowledge as part of the VET qualifications. Various concepts for the type of pedagogical approaches that are relevant here have been employed, including holistic learning, learner-centered pedagogy, practice-based learning, and experience-based learning. However, the challenge is not so much conceptualizing these types of pedagogy as enacting them. A CEDEFOP (2015a) study concluded, "Too often, learner-centered pedagogies have been advocated, but implementation has not taken place or has not been judged as successful" (p. 10). This is concerning given that pedagogy plays an important part in making the students swallow the (in the students' perception) often bitter pill of general education. A recurrent explanation for the difficulties in implementing a pedagogy that strengthens the interrelation between the general subjects and VET focuses on teachers' qualifications, including their capacity for teaching holistically, as well as how the teachers of general subjects and the teachers of vocational subjects have different understandings of the functions of the general subjects in VET (Lindberg, 2012).

In many European countries, VET programs include general education. However, a strong advocacy for including general subjects in VET reminds us that general subjects are not automatically perceived as a necessary part of VET. From research and the current educational political debate concerning general education in VET, three issues can be deduced. The first concerns the understanding of general education and the general subjects in VET. The second concerns the functions of general education and the general subjects in relation to VET. This raises a number of questions. Is general learning about educating for citizenship? Is general learning about qualifying for a vocation, or is the main purpose of general education to qualify for further studies? The third issue is pedagogical; it concerns the degree of integration of general education and VET and of general subjects and vocational subjects. This chapter examines these issues through the lens of the Danish education system.

General Education and General Subjects in Danish VET

In this section, examples from Danish VET are used to highlight the central issues in relation to the understanding, function, and pedagogy of general education and general subjects. The section is structured in four parts:

- A brief description of Danish VET within the education system for young people
- The understanding of general education and general subjects in VET
- The function of general education in VET in relation to the main challenges in VET
- The pedagogy of integrating general education and VET.

Danish VET

There are around 108 Danish VET programs, which typically take between 3 and 5 years to complete for young people aged 25 or younger, and less time for adults with work experience whose study time will be based on an assessment of their prior learning. There are two main challenges. First, relatively few students (less than one fifth of a cohort) choose to enroll in a VET program directly from basic school, the general upper secondary programs being the more attractive. Second, the drop-out rate in VET—even though it is often due to students changing from one program to another rather than dropping out of the system— is high; only around half of the students complete the VET program they have enrolled in.

Danish VET programs are structured into *basic* courses and *main* courses. The basic courses are school-based and contain most of the general subjects that students need to complete for their program. In the main courses, students alternate between school-based education and training and workplace-based training in companies. The school-based parts including the basic courses are taught at a VET college, of which there are around 90 in Denmark divided into 4 types: agricultural, commercial, social and health, and technical colleges. The workplace-based training constitutes between one half and two thirds of the entire program.

VET is segregated from the general upper secondary programs more or less in every respect, including in relation to legislation, curriculum, buildings, and teacher training qualifications. In VET, the curriculum planning requirements are the responsibility of 50 trade committees, which consist of an equal number of representatives of employers and trade unions. The trade committees draw up the curricula within the legal framework laid down by the Ministry for Children, Education and Gender Equality, and the Ministry lays down the regulations based on the wishes from the trade committees.

The Understanding of General Education and General Subjects in VET

In Denmark, as in the Nordic countries, general education is distinctively connected with primary, lower secondary, and genera upper secondary education (the *Gymnasium*). The tradition for associating general education particularly with the general upper secondary programs means that these subjects are not automatically natural parts of VET. Consequently, the admittance of general education and the general subjects into VET has continually to be argued. The Danish Act on upper secondary general education (the *Gymnasium*) supports this view with a broader definition of general education. It lists a number of statements on general education, including: (a) General education is part of qualifying for further education (i.e., developing study competence); (b) general education should develop the students' "personal authority," or ability for reflection and responsibility in relation to their surroundings and own development; (c) general education includes creative and innovative thinking; and (d) it concerns qualifying for participatory democracy, including an understanding of the possibilities of contributing individually and collectively to

"develop, change, and understand local, European and global perspectives" (Bekendtgørelse LBK, 2016, p. 1).

Two understandings of general education, which have been formulated in a study of Swedish VET, should finally be added. The first understanding is that general education is a general civic education that is targeted at all citizens qualifying for citizenship in a democratic, multicultural, and international society. The second understanding is that general education develops broad general knowledge in contrast to specific technical knowledge, thus qualifying individuals for performing in a permanently changing work life (Ledman, 2014). Relatedly, there is a discussion of the demarcation of general and vocational subjects as well as the necessity of general education in obtaining a vocational qualification. This discussion is also central in Danish VET. As part of the education system, VET must ensure that young people are educated for citizenship and for participating in a democratic society, as well as qualified for a vocation. For example, a carpentry student should learn mathematics, the sales assistant foreign languages, and the social and health student chemistry, as these general subjects are perceived as necessary for accomplishing the required practical tasks and performing within the vocation.

General subjects in both general upper secondary and VET programs can be taught at different levels, ranging from the lowest level (F) to the highest level (A). Denmark has two curricula for the general subjects in youth education programs, one for general upper secondary and one for VET. Part of the explanation for this segregation is that, to a great extent, the general subjects are taught at different levels in VET and in general upper secondary education, respectively. In VET, the basic subjects can typically be completed at the four lowest levels: C, D, E, and F. In comparison, in general upper secondary education (*Gymnasium*), general subjects are offered only at the three highest levels: A, B, and C.

In the national regulations for VET qualifications, the learning outcome for each VET qualification has been outlined, and in the curriculum for each VET program, the subjects are listed that should be completed as part of achieving the learning outcome requirements. In VET, the concept of *basic subject* is used about general subjects as well as some of the vocational subjects. Thus, the subjects in VET are divided into the following types:

- *Basic subjects*, including *general subjects* (e.g., Danish, languages, mathematics, social sciences, natural sciences, technology, and psychology) and *general vocational subjects* (e.g., introduction to the vocation, workplace culture, application for apprenticeship, society and health, planning of work and cooperation, technical documentation, technical communication, and innovation and methodology)
- *Area and specialist subjects*, which refer to the specific qualification (e.g., floor construction and wooden floors: carpentry; trends and lifestyle: sales assistant; or rehabilitation: social and health care)
- *Optional subjects*, among which the students must choose the number and levels that are specified in the regulations.

The education and training in the vocational college comprise general education and theoretical and practical vocational training. The students will mainly be

taught the basic subjects in the basic course and the area and specialist subjects in the main course. The students can complete optional subjects in the basic course as well as in the main course.

In each program, the students must pass a number of basic subjects at specific levels in order to proceed from the basic course to the main course. For example, in the program for carpentry, the students must complete mathematics at level F and technology at level F in order to proceed into the main course. Likewise, in the commercial program for sales assistant, students must complete Danish at level D, English at level D, and Industrial Training Center (ITC) at level D and, in addition, two vocational subjects: business economics at level C and marketing at level C. In the social and health care helper program, students must complete Danish at level D, English at level E, and natural science at level E. Each of the C–F levels typically takes 2 weeks of full-time study to complete, and a few take only one week or one and a half weeks.

Including different basic subjects in different VET qualifications illustrates that the basic subjects should be relevant to the particular VET qualification. The trade committees will consider which basic subjects are the most relevant in relation to the particular program. The number of general subjects and levels differ from program to program. The commercial programs are the most general, and, when compared to the technical programs, they come closest to the curricula found in general upper secondary education. The different number of general subjects and their levels might reflect not only different needs for general education in relation to the individual VET qualification, but also different perceptions of the importance of general education among the trade committees, ranging from advocating for the inclusion of several general subjects to arguing for as few general subjects as possible. Assumptions about these differences, which are still to be investigated, include whether the orientation toward general education is more dominant within the industries or trades that are in general oriented toward education, for example in social and health care programs and pedagogical programs; and whether female-dominated programs are keener on promoting the general subjects than male-dominated programs.

The organization of completing basic subjects in the basic course and specialist subjects in the main course corresponds to the typical way of organizing further education, beginning with general knowledge and proceeding to more and more specialized knowledge. However, the progression from broad introductions including general subjects to the specific vocational subjects and tasks does not comply with the needs of many of the students in VET, whose incentives for both enrolling in VET and staying there depend on their opportunities for firsthand experience with vocational practice. Norway has seen similar experiences. In Norway, VET is organized in the 2 + 2 model (2 years of school-based education and 2 years of workplace-based training), which entails a broad program for the first 2 years and specific vocational practice in the third and fourth years. However, due to this delayed encounter with a trade or industry and subsequent motivational problems, the Norwegians have introduced an initiative called Project for Immersion. This project is conducted twice during the first 2 years with the aim that the students obtain practical experiences with the trade or industry at school as well as in real workplaces. The course has proved a success

(Nyen & Tønder, 2012). As shall be illustrated in this chapter, in relation to the introductory courses in the latest Danish reform, the expansion of general learning likewise gives rise to strengthening the connection with the vocational practice.

EUX—A New Understanding of General Education?

In 2010, a new approach to the inclusion of general subjects within VET was introduced in Denmark called the EUX programs (combined vocational and general upper secondary education). They provide a double qualification recognized by both skilled occupations and further education. In the latest VET reform of EUX from 2014, it has been considerably extended to become a general opportunity in VET. In 2016, EUX was offered in 39 VET programs, including commercial, social and health care, and technical programs. The reason for the extension of EUX is young people's decreasing interest in enrolling in VET. The assumption is that when Danish VET mainly qualifies people for skilled jobs and the route to further education is more or less nonexistent and rather cumbersome, young people will choose general upper secondary education, which provides a wide range of options. Inspired by the Swiss VET system, which provides a clear route to further education, enhancing EUX has been a means of reassuring Danish young people and their parents that there are no dead ends in VET.

EUX can be said to unite the two functions of general education in VET in the sense that the general subjects should qualify both for the particular vocation and for the general upper secondary qualification, which is the admission ticket to further education. Furthermore, the argument for EUX is that students develop their competences more quickly when they combine VET and general upper secondary education: "Precisely the combination of qualifying for the vocation and qualifying for further studies means that the competences will be obtained more quickly and that the students will be more proficient in combining theory and practice" (Aftale, 2014, p. 13).

However, it is unclear at this stage whether there is an elder brother and a little brother in the relationship between VET and the general upper secondary education, the thesis being that the general upper secondary education is the elder brother. Evidence for this thesis can be found in the required teacher qualifications, which differ for teachers qualified for teaching at C and A levels, respectively. However, the requirements also include the level of the pedagogical qualifications, which for teachers in VET is level 6 and for teachers in general upper secondary is level 7 in the National Qualifications Framework (NQF). The bone of contention here is the pedagogical qualifications for teachers teaching at level C: Are teachers with pedagogical qualifications, who teach at level C in ordinary VET, allowed to teach at the same level in the EUX?

Another cause of strife concerns the curriculum for the basic subjects in VET, which has to be coordinated with the curriculum for general upper secondary education. General upper secondary education sets the standards for the content and the levels of the general subjects at levels B and A. However, level C is interesting to study, having individual curricula for general upper secondary

education and for VET. The following serves as an example of the negotiations about the contents of the subject of mathematics at level C, because the learning goals are different for this level in the general education programs and the VET programs. Students who want to shift from a VET program to an EUX program are able to obtain credits for their studies in the VET program. To obtain credits for the VET course in mathematics, VET students must have completed a level C in mathematics that corresponds to the level C in the curricula for general upper secondary education. However, the diverse learning goals for level C make it difficult for students to obtain credits for this course. At the same time, not all of the curriculum for mathematics at level C in the general upper secondary would be relevant for students who merely want to qualify for a VET qualification. Consequently, an agreement has been made between the ministerial departments for VET and for general upper secondary education, about adding learning outcomes to the subject of mathematics level C in the curriculum for VET that will both be relevant for VET students and equivalent to the learning outcomes for mathematics at level C in the general upper secondary programs.

The Functions of General Education in Relation to the Main Challenges in VET

EUX is one example of how to address one of the main challenges in VET: the decrease in the number of young people choosing to enroll in VET. Two further persistent problems also have to be considered with regard to the interrelation between general education and VET: the lack of apprenticeship places, and the scale of drop-out from VET programs. In this section, we will explore these problems with illustrations from some Danish VET reforms.

In Denmark, the tradition for including general subjects in VET dates back to the beginning of the nineteenth century with the establishment of Sunday schools. Although the history is similar across the Nordic countries, there are differences. Denmark has close links to the labor market and to the apprenticeship system, whereas Sweden has traditionally had a school-based system for VET with close links to the general educational system. Norway has developed a school-based VET system that includes elements from both the Danish and Swedish systems (Jørgensen, Michelsen, Olofsson, & Thunqvist, 2016).

With the Act of 1889 in Denmark, vocational schools became part of the apprenticeship system. However, it was not until the Act of 1921 that school-based education was made an obligatory part of VET for all vocations. Since the Act of 1956, a central feature of the Danish way of organizing the dual system is that the VET colleges should provide general education as well as theoretical and practical vocational training; this means that general education and vocational training are not segregated into two learning settings (school and workplace), as was the practice before the 1956 reform.

Even though the various Danish VET reforms have not challenged the organizational structure introduced by the 1956 Act, they have revealed the different perceptions of and assumptions about the need for general education in VET. These assumptions and perceptions have been influenced by the two main

and perpetual educational challenges in VET: the lack of apprenticeship places and, as was mentioned before, student drop-out. During a period of social democratic government, it was argued that VET should be more academic and hence that VET and upper secondary education should be integrated (Sigurdjonsson, 2003). The VET reform in 1972 thus sought to solve the lack of apprenticeships and the increase in drop-out by establishing a school-based introduction to VET programs that would ensure that young people had time to make a realistic choice of vocational qualification. A broad-basis course lasting one year and including 40% of general education was introduced. The students would gradually proceed from the broad and general introductory year to more and more vocationally specialized courses. However, the number of students who could not obtain a training place or apprenticeship increased, as did the number of students who dropped out. The explanation for the drop-out was not only due to the lack of apprenticeships; it was also the result of an overly long introductory year with too much general education. The students were not motivated by having to participate in so much general and theoretical learning. In the next reform in 1991, the idea of integrating VET and general upper secondary education was abandoned, even though a school-based entrance course was maintained as the main introduction for VET programs. If the students were able to obtain an apprenticeship or training place contract, they could begin the training in the workplace and later on complete the school-based education and training.

Furthermore, the reform sought to solve the challenge arising from a broad and general entrance by introducing a holistic pedagogical principle, which meant that the teachers should integrate the general subjects and the vocational subjects. In later reforms (e.g., in 2007), the idea was to return to an early introduction to the various vocational fields, including through an initiative called "the new apprenticeship." In summary, the Danish VET reforms show that the amount of general education and general subjects have varied in accordance with current assumptions about how to solve the main problems of drop-out and lack of apprenticeships. Furthermore, the broad introductory elements of VET programs, including increased general learning, have in particular prompted a pedagogical focus in the reforms. As has been pointed out from research, the strategies for reducing drop-out take completely opposite approaches, either arguing for broad introductory elements (including much general education) or arguing for specialized and narrow introductory elements (Jørgensen, 2011).

The latest reform of Danish VET, launched in August 2015, follows the pattern of broad introductory elements, although it focuses more on general vocational subjects than the previous reforms. The background for drafting the current reform was that a decreasing number of students were enrolling in VET (only a fifth of an annual cohort compared to a third of a cohort in 2006) and only around half of the students enrolled in VET completed the program. As much of the drop-out is due to swopping to another program, it was argued that the basic course should provide more time for the students to clarify their occupational preferences. The official agreement between the political parties about the reform says, "The basic course should provide the students with a basic vocational competence i.e. basic vocational competences and general competences as

well as more time and a foundation for their final choice of education" (Aftale, 2014, p. 8). As a consequence, the previous 12 broad introductory elements were reduced to 4: "Care, health and pedagogy"; "Office, trade and business service"; "Food agriculture, and events"; and "Technology, construction, and transport." Furthermore, the basic course was extended from half a year to include two basic courses, each lasting half a year. The first basic course, which is only targeted at young people who continue directly from lower secondary education into VET, includes four types of competences:

- Introductory vocational competences, including working environment, safety, ergonomics, and participation in work processes
- Vocational technical competences that are oriented toward the occupations and include work processes and methods, professional documentation, professional communication, innovation, work planning, and cooperation
- General competences, such as cooperation, service, personal hygiene, and social and labor market conditions. General subjects are also included: Danish, mathematics, English, and natural sciences.
- Study competences or basic general skills such as reading, writing, and calculating.

Study competences have been included in the learning outcome for VET, signifying a wish to appeal to the young people who want to continue in further education.

The aim was to provide the students with an introduction to a wide range of educational options. In the second basic course, the students should obtain the competences that will give entrance to the main course within the specific VET program. These competences include general and vocational subjects that are relevant for the particular occupation. The prolonged and broad basic courses immediately prompt considerations about the contents of the curricula: What do the students need to learn in order to make their choice, and how do we prevent the students from dropping out?

As it is not possible to introduce the students to specific practical tasks within specific occupations in four broad introductory elements, a new general vocational subject, "Introduction to the Vocation," was developed, the idea being that this subject would be relevant to all programs. Thus, the reform has further strengthened the general vocational education element, the intention being that it signals that the students have enrolled in a VET program, while at the same time establishing some kind of broad and general education that provides time for students to make course and career decisions. The first basic course includes, therefore, vocational education, whereas the second focuses more on vocational training, even though this training is mostly theoretical. Government documents about the reform show that it has been acknowledged that the general vocational subjects cannot alone solve the problem of guiding the students to choose a VET program, as this guidance will have to include the students experiencing the particular vocation. Consequently, the reform emphasizes the need for holistic pedagogical principles in order to relate the general subjects and the general vocational subjects to specific vocations.

Alongside developing the reform, the curricula for the basic subjects have been revised. The purpose is not only to include the new basic subjects but also

to describe the subjects in a way that balances the two aims: training the students in the subjects, and training the students to apply knowledge and cognitive skills from the subjects to accomplish practical tasks within the vocation. In this way, the subjects are perceived as both learning targets in themselves and as means in relation to performing in practice. An example from the formulation of the objectives in the subject of Danish illustrates that it should be taught not only in relation to the vocation; the objectives also include performing in society and personal development: "The objectives in the subject Danish in VET include strengthening the student's qualifications for using the Danish language in vocations, education, society, and daily communication and cooperation, and as a tool for perception, experience, tolerance and community" (BEK, 2016).

As has been emphasized in this chapter, one of the central elements in the organization of the basic course in the latest reform is a strengthening of general vocational subjects and the focus on general vocational subjects. One might argue that it is not important to distinguish specific vocational subjects from general vocational subjects. However, the increase of general vocational subjects not only reflects the need for combining broad introductory elements with vocational particularities. The general vocational subjects are also a result of an increasing focus on young people's conduct and manners in the workplace, that is, young people's personal and social performance. According to employers, students not only need to solve tasks; they also need to learn how to behave in the workplace. This aim of developing the students' general performance and appearance is high on the agenda, not least due to a reluctance by employers to take on young apprentices, the reason being that the young people are not mature enough to participate constructively in the workplace community of practice. Consequently, employers want young people to develop the social and personal competences that are relevant for performing in the workplace. The time before applying for an apprenticeship has thus been prolonged, the focus being on developing young people's personal and social competences, including their personal appearance (e.g., the course in personal hygiene). Even though employers' complaints about young people are not new, personal and social competences have gained ground in the VET curricula, not least influenced by the highlighting of these competences in statements from supranational agencies such as CEDEFOP (2015b) and the OECD (2005).

In addition to the explanations for the increased focus on general subjects, the increase or reduction of general subjects is basically a result of the current policy in the country. In a Swedish study of the general subjects in VET, Ledman (2014) shows how the perception of what is the requisite general education and the necessary general subjects in VET has shifted with a change in government from a social democratic and relatively left-wing government to a liberal right-wing government in 2009. The social democrats prioritized general education in VET, with a broad and comprehensive understanding of general education not least in the Swedish reform in 1991. In contrast, in connection to the reform of 2007, the liberal government argued that VET was too theoretical and should train directly for the labor market and for further vocational training. Furthermore, the liberals argued that the vocational training element should be increased and

the general education element reduced, general education being perceived as the responsibility of the basic school (Ledman, 2014, p. 35).

In summary, two main purposes of general education and the general subjects in VET can be elicited. The first purpose is citizen education, which in Denmark can partly be explained by the fact that VET is part of the youth education system. The second purpose is qualifying for a vocation. The Danish EUX initiative can be perceived as a unification of the two understandings leading to the double qualification of skilled work and admission to further studies. The functions of general education can be perceived in relation to the current challenges in VET. General education and general vocational education are employed as a means of creating space for students to choose their occupation and education. In this perspective, general education serves as guidance, combined with development of students' personal and social competences. However, general education is also perceived as a hindrance for choosing VET courses and, not least, as an explanation for the currently large drop-out rate, with only 50% of the students who enroll in a VET program completing the program. From this perspective, it is argued that general education and general subjects should mainly be instruments in accomplishing the tasks within the vocation.

In relation to the proportion of general subjects and general vocational subjects in VET, it seems appropriate to argue that the proportion of general education is increasing. If this tendency is correct, it requires a stronger focus on developing teaching methods that can orientate the general learning to—in the students' perceptions—recognizable practice situations.

The Pedagogy of Integrating General Education and VET

The pedagogical principles in relation to teaching general subjects and vocational subjects are founded in the ambition of integrating general education and VET. The pedagogical principles include, for example, holistic learning, practice-based teaching and learning, interdisciplinarity, problem-based learning, and learner-centeredness. The latter is a consequence of the desire to relate learners' experiences from working life or leisure activities to the theoretical matters at school. It has been argued that vocational pedagogy is influenced by the way the learning outcomes of the VET programs are described. Thus, broad and general learning outcome descriptions enable a learner-centered pedagogy: "when learning outcomes articulate competences in a relatively general, rather than a highly specific manner, when they integrate knowledge and skills, and when they include transverse or generic skills, it is easier for teachers to adopt learner-centered pedagogies" (CEDEFOP, 2015a, p. 8).

One discussion in relation to learner-centeredness and practice or experience-based teaching concerns the direction of the learning. Should the learning process take its starting point from the students' experiences (inductive principle), or should the process begin with teaching the theory that the students should learn and then referring the theory to practice (deductive principle)? The inductive principle has been criticized for leading to an overly narrow learning

outcome limited to the skills and competences that the students need to accomplish practical tasks in specific workplaces. In contrast to learning based on the students' experiences, *conceptual progression* prescribes that the teaching of concepts should be based on systems of meaning of these concepts, referring the concepts to relevant experiences and thereby ensuring the development of the students' ability for abstract context-independent thinking (Rata, 2016). Likewise, Gamble (2014) argues that the pedagogy of craft is about moving between parts (e.g., a concrete "table" to be constructed) and wholes (the abstract concept of *table*). Based on her own and others' research, Gamble advocates for employing the deductive principle in a knowledge-structured curriculum (Gamble, 2014, p. 69).

Another issue concerns the vocational orientation of the general subjects: For example, carpentry students learn carpentry mathematics, sales assistant students learn sales English, and culinary students learn kitchen chemistry. In the curriculum, the subjects are not described in a vocationally oriented way; they are only described as general subjects. Thus, enacting the vocational tone of the subjects becomes a pedagogical task, something that the teachers plan and accomplish in relation to their individual classes, resulting in a diverse practice (see also Broad and Lahiff, Chapter 22).

A third and final issue concerns the integration of the general and the vocational subjects, the idea being that the teachers of general subjects together with teachers of vocational subjects plan and accomplish courses in which general and vocational subjects are integrated. One of the main challenges in relation to this cooperation is that often the teachers will base the drafting of the interdisciplinary course in their individual subjects. Instead of designing a course around a specific project that students can work on (i.e., an authentic problem within the occupation or trade), the teachers plan a course in which specific subjects should be integrated, for example mathematics, material science, and a language. Given this emphasis on the individual subjects, the risk is that the problem that the students should solve becomes forced and artificial. The teachers invent integration or ways of vocational orientation that do not reflect real practice and cannot be recognized by the students (Aarkrog, 2014).

No matter whether the inductive or the deductive principle is employed as the pedagogical principle, and no matter whether the general subjects are vocationally oriented or integrated, a recurrent challenge is that the students often do not perceive the coherence between the general and the vocational parts of the programs (Aarkrog, 2014, 2016). Students have difficulties in moving between "part" and "whole," particularly if the "whole" is the general knowledge and the "part" is the practical task or experience from practice. Many students in VET do not have the ability for abstractions to enable them to learn from examples. Examples become the goal and not the means to reach the theoretical goal.

As mentioned in this chapter, the 1991 Danish reform of VET introduced pedagogical changes, including the holistic principle and practice-based teaching. Twenty-five years later, in the latest VET reform, the same pedagogical principles are highlighted, not least in relation to the broad basic course, where

the pedagogy should be holistic and project based in order to "ensure coherence, relevance and optimal learning" (Aftale, 2014, p. 11). The continued focus on holistic and practice-based teaching bears witness to the difficulties inherent in these pedagogical principles. In the latest reform, these difficulties have been recognized, resulting in a systematic and non-preceded intervention into the pedagogical practice in the VET colleges. This includes introducing the obligation for each college to establish and implement a mutual pedagogical basis that should permeate all pedagogical practice. Among other achievements, the mutual pedagogical basis should include strengthening holistic and practice-based teaching, including increased cooperation with the companies where the students accomplish the practical training. Furthermore, the reform has introduced an obligatory pedagogical course that all teachers should complete as well as short periods of company internship for the teachers.

Theoretical knowledge and practical knowledge are often perceived as dichotomies emphasized by a negative attitude to theoretical knowledge, particularly in male-dominated VET programs. Applying Bernstein's concepts of "classification" and "framing," a study of Swedish and Finnish male-dominated VET programs concluded that a classification based on the division of theoretical and practical knowledge and work "is fallacious because one cannot do (advanced) practical work without simultaneously doing intellectual work" (Niemi & Rosvall, 2013, p. 457). For Bernstein, framing concerns the pedagogy and in particular the degree of control that teachers and students exert on, for example, the selection of the knowledge to be learned (see also Chapter 6, this volume). The Swedish study showed that a strong framing is needed, with teachers systematically guiding the students to perceive theoretical knowledge and practical knowledge as inseparable and in alignment with the demands of the labor market (Niemi & Rosvall, 2013, p. 458). Likewise, in a study of a physical education program, where the curriculum is too limited to ensure both general and vocational learning, the teachers' ability to provide education that moves beyond the relatively restrictive, competency-based program is central for educating critically thinking students (Brown & Macdonald, 2011).

One way of integrating or connecting the subjects is through collaborative teaching, in which teachers who are qualified for teaching general subjects co-teach with teachers qualified for teaching vocational subjects. In a study about pre-vocational education in Jordan, it was found that collaborative teaching had a positive impact on students' achievement and on their motivation for learning vocational subjects, because the students understood how theoretical subjects can be used in accomplishing practical tasks (Al-Saaideh & Al-Zyoud, 2015).

Likewise, an Australian study of models for integrating language, literacy, and numeracy (LLN) in VET advocates for models where the LLN teachers have a close working relationship with the vocational teachers either in team teaching or in team-based design of the courses (Black & Yasukawa, 2013).

Finally, a Norwegian action research study (Hiim, 2015) also highlights the importance of the teachers' competences in relation to the integration of general and vocational subjects. In the study, the aim was that, as much as possible, the general subjects and vocational subjects should originate in the needs for

competences in the current occupations as well as in the students' work experiences. The study showed that the teachers lacked broad vocational knowledge, which among other things encumbered their cooperation with the workplaces about the content of the courses. The study points to an important challenge in relation to the vocational orientation of general subjects (e.g., Norwegian, English, mathematics, and science). The regulations for these general subjects do not include requirements for a vocational orientation in the courses or in the exams. In addition, the teachers of general subjects have often no experience with or even knowledge about the current vocations, industries, or trades. As the students are observant of the relevance of the subjects in relation to the vocation, industry, or trade, the teachers' lack of vocational experience and knowledge negatively influences the students' motivation for learning general subjects. The study showed that intensified cooperation between the teachers of general subjects and the teachers of vocational subjects about developing cross-disciplinary themes and tasks had a positive impact on the students' perception of the meaningfulness of the general subjects (Hiim, 2015, pp. 143–144). Thus, the study reaffirms the intention from the latest Danish VET reform that teachers, including the teachers of general subjects, should participate in internships in companies as part of ensuring solid interrelations between general education and VET.

Concluding Remarks

Based on the overview of general education and general subjects in VET, exemplified by the Danish VET system and its reforms, general education and general vocational education are anticipated to increase. Traditionally, general education does not belong in the VET system, and even though general education has a long tradition in VET in the Nordic countries, general education remains somewhat external to the VET system. The formulation of curricula for general education and the qualifications among teachers of general subjects are founded in the general education system. Making vocational adjustments to the general subjects is not straightforward but needs to be negotiated, often interfering with or even offending teachers' professional self-images. The current lifelong-learning discourse, with its focus on assessment of prior learning, permeability, and no dead ends in the educational system through providing double qualifications like the Danish EUX, calls for a discussion of the relevant content of general education, including a discussion of whether or how to bridge the gap between general education and VET.

So far, the vocational orientation of general subjects has mainly been a pedagogical responsibility. As has been argued in this chapter, the more general the courses in VET, the more the students need to be motivated for these courses and supported in obtaining the learning outcomes. Consequently, a strengthening of the teachers' pedagogical qualifications is crucial, as well as developing, implementing, and researching pedagogical methods that support the students' motivation and cognitive abilities for learning and applying general education in work, in studies, and in society.

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15

The Sustainability of the Dual System Approach to VET

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Introduction

In comparative research, vocational education and training (VET) has traditionally been studied from a typological perspective. In most of the typologies in educational science, political science, or labor market research, dual vocational training is treated as a specific approach or model of VET with features that are profoundly different from school-based or workplace-based training systems. Terms such as "state-regulated market model," "cooperative training model," or "occupational qualification style" (Deissinger, 1996) are used to analyze different aspects associated with the characteristics of dual training. Other typologies classify dual characteristics using economic or political categories. Typologies based on what political scientists have called the *Varieties of Capitalism* approach (Hall & Soskice, 2001) refer to *employer commitment* and *public commitment* as dimensions that distinguish skill formation systems. The dual system type is characterized as a "collective skill formation system," which represents the "Continental European variety of coordinated capitalism, associated with conservative-corporatist education and training" (Busemeyer & Schlicht-Schmälzle, 2014, p. 56). This characterization is associated with Germany, Switzerland, and, to a lesser degree, Austria, Denmark, and the Netherlands, although the scale of apprenticeship varies between these three countries (Deissinger, 2010; Deissinger & Gonon, 2016; Gonon, 2008).

It is clear that this type of VET system, which we call a *dual system*, differs from what may be called a *market model* or a *liberal skill regime* in Anglophone countries (Busemeyer & Schlicht-Schmälzle, 2014; Keep, 2015; Marhuenda, 2000). Wheelahan and Moodie (2017) argue that, in the latter case, the fact that these "market economies have few or relatively weak institutions for coordinating education and employment systems and thus qualifications and occupations"

implies an "educational logic" that promotes "transfer between sectors and fields of postsecondary education," but obviously fails to "support as strongly graduates' transition to employment" (p. 23). VET systems with a strong occupational orientation (Deissinger, 1996), quite contrarily, signal that skills and competences of graduates are based on specific conditions of training and assessment, which means that they are neither "outcome-based" in an Anglophone understanding, nor do they trust in the unlimited flexibility of labor markets and recruitment practices of companies. In countries where we find apprenticeship as a socially accepted transition pattern into skilled employment, VET is often delivered using this traditional occupational concept coupled with an alternating mode of learning. This is why these systems, mainly in Germany, Switzerland, and Austria but also in the Netherlands and Denmark (Gonon, 2008; Jorgensen, 2004), are known as *dual systems*.

In Germany, the dual system has for many decades been considered to be both the most important subsystem of VET and a "natural" postsecondary pathway into skilled employment for a large share of the school-leaving population. In Switzerland, Austria, and in Germany in particular, dual systems are specific historical derivatives of apprenticeship. However, despite industrialization as one of the major common features in modern history, differences between the German-speaking systems and those of most other countries in Europe in terms of a specific apprenticeship culture or learning culture persist. They include different notions of what countries perceive as "educational" or "pedagogical" with respect to their VET systems and therefore the way their systems connect the idea of training for an occupation or a job to the notion of personality development of individuals. In the case of Germany, the vocational part-time school (compulsory since the late 1930s) represents this educational corrective in a system that is predominantly determined by nonstate stakeholders. This entails a specific understanding of teacher education, more or less in line with that of upper secondary school teachers, which also represents a socially accepted form of pedagogical underpinning of what is going on in the company part of the training process. The overall regulation pattern in the dual system therefore is comprehensive; that is, it is not restricted to those institutions directly accountable to state regulation and supervision (Deissinger, 1996).

From another perspective, however, the question arises as to whether this characterization of the dual apprenticeship system might be justified. Although it has long been considered a "mass apprenticeship system based on the strong occupational identity of those holding the corresponding qualifications" (Ryan, 2003, p. 150), we now see that the problem of an emerging "battle for apprentices" has entered the current public agenda—with employers competing for "applicants in a market for school leavers choosing among firms rather than firms choosing among applicants" (Jacob & Solga, 2015, p. 169). This new problem appears to be particularly associated with the challenges emanating from tendencies toward *tertiarization* within the German educational system (Deissinger & Ott, 2016). Hence, the new stream of criticism has moved away from an "internal" perspective and toward the question of whether the dual system and, with it, non-academic pathways into employment still find their deserved social acceptance alongside higher education. The new view is rather

an "external" one, focused on the various subsystems of the German education system and their links to each other. The issue of sustainability of the dual system approach in VET, at least in the German case, is closely associated with its capability to cope with spreading academization, which Germany is likely to experience in the future.

This chapter will present some of the major developments in the emergence of what is now called the *dual system* by looking at the most relevant historical and cultural imprints. When talking about *vocationalization*, we emphasize that initial training at the end of the nineteenth century in Germany returned to its traditional roots based on corporatism, whereas dualization, mainly due to the influence of education theory, only gradually became the second (compulsory) pillar of this very specific model of skill formation.

The Cultural Imprints of VET in Germany: Dualization and Vocationalization of Apprenticeships as Parallel Historical Processes

In the English-speaking VET research community, the German dual system has traditionally received major attention because of its structural specificity, its traditional working principles, and, above all, because it seems to solve the problem of integrating young people into the labor market relatively smoothly (Prais, 1981; Raggatt, 1988). In contrast to the fragmented architecture of the English VET system and its disregard of substantial pedagogical underpinning of workplace learning, which seems to be a feature of apprenticeship (Fuller & Unwin, 2003), the German system is characterized by working principles that pay tribute to both private and public interests and standards. Raggatt (1988, p. 176) highlights these features when he refers to the traditions underlying the German apprenticeship system and the mechanisms of cooperation and problem solving within the dual system. The following quotation makes clear that, in this understanding of VET as both a private and a public issue, a "binary" view of the relationship between the state and the private sector becomes more or less diluted:

> Whereas in Germany the law is regarded as guaranteeing rights, in England legislation is viewed as restricting rights. Hence where the role, responsibilities and obligations of the participants including structures for cooperation in the dual system are set out in law there is very little comparable legislation in England. The law, then functions as a primary source of quality control in Germany. The system established in law provides continuity with the past building on established models and traditions. (Raggatt, 1988, p. 176)

Keep (2015) extends this argument by pointing out that, in the UK, there is no overall "education and training 'system' within which governance takes place … but rather a set of related but fragmented and in some instances partially overlapping sub-systems or streams of activity" (p. 464). Due to a lack of substantial activities on the side of the state, VET adopted the role of "a relatively low status

area … seen as a residual catch-all category for those activities not assigned to schools or universities" (p. 464). In Germany, the key structural features of dualization (i.e., integrating the school and the notion of *Bildung* into the apprenticeship system), and the emergence of self-government of chambers and participation of nongovernment institutions, helped avoid such an assignment of status. This is especially because employer organizations and trade unions have since then played a major role in the dual system, underlining the benefit of structured training for both companies and employees (Deissinger & Gonon, 2016). Ironically, the new system of industrial training emerged in a climate of anti-industrial agitation holding up the idea of *Beruf* (vocation/occupation) in a time when industrialization reached one of its peaks in German economic history (Winkler, 1976). The pivotal amendment that modern apprenticeship legislation later added to the foundations laid in the late nineteenth century was the involvement of both the state and the trade unions within a system that still is corporatist in its basic features (Deissinger, 1994; Winkler, 1976). The 1920s and 1930s may be considered as the "maturing" period in the social, educational, and economic construction of the dual system, although it received its name only in the early 1960s (Greinert, 1994).

The present system of chambers and social partners has developed since the late nineteenth century. The 1897 Trade Act (*Handwerkerschutzgesetz*) was one of the outcomes of this policy. It is now seen as an oblique predecessor of the current Vocational Training Act. Although it did not prescribe the *Meisterbrief* (master's certificate) as a training prerequisite, the Act of 1897 revived some of the apprenticeship regulations that stemmed from the Middle Ages. The newly established chambers and guilds became systematically involved with training matters and were given the right to hold examinations for journeymen and master craftsmen. This Act also made provision for the technical qualification required for the training of apprentices by confining it to skilled journeymen of at least 24 years of age who had either served a 3-year apprenticeship or pursued their trades for at least 5 years as independent artisans. Contracts between apprentices and employers became general practice in the craft sector, as well as the 3-year training period, at the end of which the apprentice should have the opportunity to take his examination. The *Handwerkerschutzgesetz* laid the foundations of the corporatist framework typical of the dual system up to the present day (Deissinger, 1994; Greinert, 1994).

On the school side, Georg Kerschensteiner (1854–1932), known as the "father of the German vocational school," started to bridge the gap between elementary school education and the beginning of military service institutionally and didactically with the underlying ideal of *Menschenbildung* (education of the individual). His clear message, focusing on the concept of *Beruf* as a crucial category of human life, the social role of work, and the notion of civic education, was that the vocational school should no longer remain the "poor cousin" of grammar school education. He conceived the individual as a social being, with respect to both his occupation and his citizenship within the community. This meant a complete break with traditional educational thinking. Kerschensteiner's Prize Essay, delivered to the Erfurt Academy of Sciences in 1901, must be seen to comprise thoughts that were to be of revolutionary

significance for the German education system and eventually led to today's dual system (Winch, 2006). The vocational school should become an educational institution with a singular purpose and a profound pedagogical underpinning (*Bildungsauftrag*). Winch (2006) argues that this great educational reformer "puts the experience of working people at the center of moral concern and at the same time suggests that the workplace is a suitable site for the accomplishment of one form of liberal education" (p. 383). The educational connotations of this vocational theory must not be underestimated as they form a specific cultural imprint on the German dual system.

Working Principles and Structural Facets of the Dual System in Germany

The dual system is a subsystem of VET with a singular function: imparting initial training to school leavers in a defined range of *declared trades* or, in the German terminology, *recognized training occupations* (*Ausbildungsberufe*). The two sites of learning—the training company (*Ausbildungsbetrieb*), which has to prove that it is eligible to train apprentices, and the part-time vocational school (*Berufsschule*)—mainly coexist, although they have a common task (Greinert, 1994; Deissinger, 2010). Compulsory instruction in the part-time vocational school is based on the state school legislation of the federal states, and also, indirectly, contained in some of the stipulations of the Vocational Training Act. According to this law, which exclusively regulates the company-based component of the dual system, it is the duty of the company to see that apprentices attend the vocational school within the time they are released from instruction and work in the enterprise (mostly on a day release basis, normally not exceeding one and a half days per week). When it comes to working time and working conditions, there are other enactments, such as the Youth Employment Protection Act (*Jugendarbeitsschutzgesetz*), which oblige employers to deal with apprentices as a special group of employees. It is therefore important to underline the "protective" character of both the school law and the federal training law (basically an employment law), which distinguishes between VET in the apprenticeship system and ordinary employment contracts (Deissinger, 1996). This is different from English-speaking countries like Australia, Canada, and the UK, where apprenticeships are neither institutionalized as alternating schemes of training nor focused primarily on young school leavers (Deissinger & Gremm, 2017).

The dual system therefore stands for an institutional setting, which, on the surface, consists of a structural and didactical combination of work-based instruction, work experience, and theoretical learning in a vocational school. Historically, the terminology stems from the 1960s, when the German Education Commission labeled German apprenticeship as a *dual system* with equal status, although specific functions, of both learning institutions. Table 15.1, however, which shows the dimensions of the dual system, casts doubt on its "system character" as well as the functional equality of the two learning venues—which is also due to the federal states being in charge of education and therefore the vocational part-time school (Deissinger, 2010; Greinert, 1994).

Table 15.1 Dimensions of the German dual system.

	Vocational part-time school	Training company
Legal status	Public	Private
Supervision	School administration	"Competent authorities" (chamber system)
Legal basis	Education law (federal state)	Vocational training law (central state)
Young person's status	Student	Apprentice
Training personnel	Vocational teachers	Masters and trainers
Didactical instrument	Vocational syllabus	Training ordinance
Form of learning	Classroom instruction	Workplace or workshop instruction
Content of learning	Theoretical	Practical
Kind of award	School certificate	Chamber skilled award

As the apprenticeship system is neither part of the school or education system nor a normal sphere of work, it is clearly more aligned with training and recruitment for skilled work. Such a clear separation of pathways or subsystems implies that the dual system has to cope with frictions in the training market that can hardly be compensated without additional activities on the side of the state. In the late 1990s, the so-called *transition system* (*Übergangssystem*) emerged as a "constitutive, third institutional sector of Germany's VET system and has expanded considerably since the 1990s" (Jacob & Solga, 2015, p. 167). Generally speaking, as in the current *National Education Report*, the number of people with low qualifications is described as "too high" and likely to rise against the background of more and more migrants and asylum-seekers entering the education system (Autorengruppe Bildungsberichterstattung, 2016, p. 13). It is also an interesting statistical fact that, although more low-achieving school leavers now participate in the VET system in general than in former decades, too many of them do not succeed in obtaining full qualifications for the labor market. This makes the "transition system" a permanent "construction site" within the German education system (Jacob & Solga, 2015, p. 168).

Apprenticeships, full-time VET and the transition system are only loosely connected with each other, as they may be seen as only functionally dependent on each other. Although there is a general expectation that vocational preparation should lead into an apprenticeship, the vocational schools outside the dual system are nowadays mostly providers of higher level educational qualifications, which are well received by employers. Nevertheless, all these schools and courses are in most cases physically assembled under one roof in vocational schools. However, school-based VET leading to qualifications relevant for employment remains detached from the dual system and may be seen as the clearly weaker subsystem when it comes to portable qualifications relevant for employment (Deissinger, Aff, Fuller, & Jorgensen, 2013; Deissinger, 2019).

It is the so-called *Berufsprinzip* (vocational principle) underlying training in the dual system that makes it workplace-led and predominantly practical. However, it is essential that the system works in accordance with skill requirements defined from the workplace, because training should not be "task-based" but "occupation-based." Although competences in the English or Australian understanding have a functionalist meaning by referring to specific workplaces or workplace activities (Hellwig, 2006; Jessup, 1991; Misko, 1999), in Germany, the notion of *Beruf* implies a holistic competence portfolio that is strictly bound to a uniform pattern of training and regulations that are commonly shared by state, public, and private stakeholders. The latter allows the system of skill formation to become partly independent of market forces, trusting in "institutions of coordination" that are protected by the law but nonetheless are meant to work in a public way; for example, the chambers that are responsible for the supervision and assessment of workplace-related training in the dual system (Deissinger & Gonon, 2016; Wood, 2001).

Modernization within the dual system currently seems to happen mainly at the curricular level (see also Chapter 16, this volume). It has materialized in the creation or revision of training schemes within the system of "skilled training occupations," which now allow for modest features of modularization. Implanting modules within training schemes as didactical units with a mandatory but elective character (e.g., new IT occupations created in 1997) no longer seems to be incompatible with a holistic notion of competence (Euler, 1998; Pilz, 2012). At the same time, curricular provisions that take account of new technological developments and/or needs of companies to react quickly to these changes, including more flexibility for training, are now much more relevant than some 30 or 40 years ago, when major modernization activities began to "cleanse" the existing system of training occupations. Today, using modules in a more open manner means that companies can adapt their workforce development at the level of initial training to their specific organization and technologies, although there is a general conviction in the research community that the system ought to become even more flexible (Euler & Severing, 2006). All in all, some 330 training occupations are offered to young people, the majority of which are 3-year training courses. The sector known as "Industry and Commerce" takes the majority of apprentices (some 300,000 young people started their training in 2016, which is nearly 60% of all new apprenticeships). The number of companies engaged in training for the dual system in Germany is slightly declining and now stands at 20% (BMBF, 2017). However, smaller companies are less engaged in training than large enterprises of which more than 80% are training companies (BMBF, 2018, p. 210). One of the reasons for this seems to be that small enterprises find it more difficult to recruit suitable school leavers (BMBF, 2017, p. 10). Nevertheless, some of the craft occupations, with the *automobile mechatronic* occupation at the top, are predominantly male, whereas in the service sector female participation is markedly higher (e.g., in hairdressing, but also in banking and insurance). Therefore, it may not be an exaggeration to maintain that dual apprenticeships are, generally speaking, "attractive for school leavers because they are sponsored by firms," which are eager to recruit their future employees from the dual system, whereas the government, in times of a

sluggish training market, has always remained reluctant to introduce a levy system or even shift occupations from the dual system to full-time VET (Jacob & Solga, 2015, pp. 163, 167).

Besides training market conditions, there is now a changing environment for VET. The largest group of new apprentices now comes from the intermediate secondary schools (*Realschulen*) or from vocational schools delivering an equivalent qualification (*Fachschulreife*). School leavers with a higher education entrance qualification are still an important clientele for the service economy; for example, in banking, some 70% of apprentices hold one of the two highest school-leaving certificates (*Abitur* or *Fachhochschulreife*), and most of them graduate from the commercial high schools (*Wirtschaftsgymnasien*) before they apply for a training place. So there is still evidence that the dual system attracts a broad range of school leavers, although it depends on the occupational field and the perceived attractiveness of occupational careers. In contrast to banking, among shop assistants in food retailing, most apprentices only hold a lower secondary school qualification, the lowest accepted rank in the secondary school system. It is therefore correct to maintain the argument that the dual system, like the higher education system, manifestly reflects the structural facets of the German education system.

The fact that academic drift is now influencing the aspirations of young people poses the question of whether the dual system will be able to preserve its appeal for young people from the higher stratum of the school system in the future. It seems that traditional VET courses are coming under pressure with the increasing share of school leavers eligible for higher education entrance (Jacob & Solga, 2015, p. 162).

Sustainability of the Dual Training Approach in the Context of Academization

The dual system, and with it VET in Germany, is not a "problem-free" zone. There are three obvious problem areas affecting the system's sustainability. First, as already mentioned, the formal links between different streams within the VET architecture—full-time VET, the dual system, and the transition system—are comparatively weak (Euler & Severing, 2006). If there are links, they are normally highly dependent on federal state or regional regulations, especially when it comes to vocational preparation and integration measures. Second, differentiation within VET is also weak in terms of skill levels and duration, which would be important with respect to supporting disadvantaged young people training in the dual system. Although 26 occupations are ranked as *2-year training courses* (e.g., the first stage of the retailing occupation), most require a renewal of the training contract after 2 years once the young person wants to continue in case there is an institutional option for a third training year. A similar problem also exists for widely missing links between the apprenticeship system and higher education and the virtual non-existence of hybridity (Deissinger et al., 2013). Third, links between nonformal and informal learning and formal VET are not strengths of the German VET system. Both the UK and France are more progressive in this respect: the UK

with its competence approach, which spans initial and continuing training, and France with its VAE (*La validation des acquis de l'expérience*) system that helps people to access all the formal qualifications in the VET system through a nationally regulated *recognition of prior learning* (RPL) approach (Deissinger & Ott, 2016, pp. 284).

Nevertheless, there is quite a lot of ambivalence about whether these aspects are really problems. The "weaknesses" that we have outlined here may also be seen as strengths of the apprenticeship system. Its "system reference" is clearly different from all other subsystems, and its labor market functionality explains its overall national esteem among companies, school leavers, and, above all, politicians. Academization, however, is now appearing as one of the most obvious challenges for the dual system and raises the question of whether this development is strong enough to produce a potential hazard for VET in the dual system. The global "academic drift" toward upper secondary education (which also means delaying or at least reducing selection after primary school) has a lot to do with the educational aspirations of parents, as they are manifestations of what sociological research has called "meritocratic logic" (Goldthorpe, 1996). According to this principle, which governs the social attributes given to education and educational decisions, the main function of certificates, qualifications, and underlying pathways does not lie in the benefit of the contents of the respective qualification, but rather refers to its formalized result. One of the implications or, more precisely, causes of this belief in the value of higher education achievements as such seems to be a lack—or, in the German case, a creeping loss—of appreciation of VET in society.

Thus, one crucial consequence of meritocratization seems to be the decreasing relevance and acceptance of those institutions that traditionally have prepared pupils for vocational training, the lower secondary schools (*Hauptschulen*). These schools are now increasingly enrolling lower achievers who have not succeeded in progressing to the upper streams of secondary education. At the same time, companies wishing to secure their future demand of skilled employees notoriously complain about competence deficits among potential apprentices graduating from the lower ranks of secondary education. This has led to the above-mentioned "battle for apprentices," as companies now seek to get hold of the most talented school leavers with acceptable social competences and good marks. Hence, demand from employers for young apprentices is still strong.

Recently, however, VET statistics in Germany revealed that the dual system is losing its overall importance as *the* "normal pathway" into employment (BiBB, 2016a, 2016b). Since 2013, the number of apprentices starting their training has been lower than the intake of higher education institutions. The following quotation from the 2015 *Federal Training Report* summarizes these tendencies quite clearly. Although it would be too far-reaching to forecast a permanent decay of the dual system, the facts indicate that the sustainability of the German apprenticeship model could be more at risk in the future:

> 2014 saw a continuation of the trend that had persisted on the training market over the past three years. Reasons for this included falling numbers of school leavers, a greater propensity to seek to enter higher education and the matching problem. Provision of and demand for training

places both decreased, and the number of newly concluded training contracts fell once more. The figure for 2014 was 522,000, a new all-time low. In 2014, there was a particularly strong rise in the proportion of unfilled training places. At the same time, participation in dual VET … by persons interested in training decreased, meaning that fewer trainees were acquired for such training. (BiBB, 2016b, p. 13)

The decline in apprenticeship numbers has been particularly strong in the craft sector (*Handwerk*), which is the training sector in Germany with the most traditional understanding of apprenticeships, covering small and medium-sized companies. Here, the number of apprentices fell from some 550,000 in 1992 to around 380,000 in 2013, whereas the trainee stock remained more or less stable in Industry and Commerce (BiBB, 2016b, p. 24). Labor market researchers claim that one of the problems of the dual system lies in the fact that the German economy has been subject to sectoral changes (toward service occupations) since the 1970s, which mainly affects the traditional "manual" occupations (Jacob & Solga, 2015, p. 163).

In Germany, academization was observed as early as the 1960s. Between 1965 and 1990, the share of school leavers with an *Abitur* rose from some 7% to 27% (Jacob & Solga, 2015, p. 163). The recent academic drift particularly materializes in the concept of the *Gemeinschaftsschule* (a kind of comprehensive secondary school merging the lower and the intermediate secondary school), where objectives such as permeability and equality of opportunities are the underlying pedagogical—and, more to the point, political—motives. The federal state of Baden-Württemberg's abolition of the process by which parents receive information about and recommendations on where they ought to send their children after year 4 (i.e., at the age of 10) provides further proof that education policy supports the attitude that higher education is the naturally more rewarding and socially preferable pathway for young people. It may be said that this mentality already has the potential to foster those negative dynamics for the future of the dual system, which are neither socially nor economically founded. It is a statistical reality in Germany that, since 2013, the number of young people taking up higher education courses has topped the number of school leavers embarking on a dual apprenticeship course (BMBF, 2014, p. 6). Between 2000 and 2013, the number of new entrances into the dual system decreased by 15%, whereas the number of those who accessed tertiary institutions increased by 59%. Meanwhile, fewer young people find themselves in non-academic vocational apprenticeships (outside full-time vocational schools or the transition system) than in tertiary institutions. The number of people aged 30–35 years with a higher education entrance qualification now stands at 43%, as against 22% among 60–65 year olds (Autorengruppe Bildungsberichterstattung, 2016, p. 7).

However, academization or academic drift in the German context must not only be seen as jeopardizing the apprenticeship system and with it "vocationalization" within the education system. Four types of academization can be distinguished. They reflect both changes in individual educational behavior and also the impact of these changes on the skill formation system itself. Since the 1970s, Germany has experienced a visible expansion of higher education participation

due to a more "open" policy of federal state governments toward the traditional understanding of the selection of pupils into the three different streams of the school system (lower, intermediate, and higher). The school-based section of the VET system in this context used to have a compensating function in terms of this selectivity, but now faces pressure from the general school system with more and more young people taking the direct route to universities or universities of applied science. This trend in the education system also becomes visible in those educational streams leading away from the traditional VET system, such as "dual universities," which have been successful in attracting grammar school leavers in recent years. Interestingly, the insight that educational expansion and the underlying meritocratic aspirations are bound to affect VET had been discussed as early as in the late 1950s. Today, however, we are challenged to look at this phenomenon in a more differentiated way.

First, quite a number of VET schools and courses correspond more or less directly to the higher education system in a functional sense by offering the same certificates as higher secondary schools (Deissinger, 2019). This mainly applies to higher vocational schools such as the *Berufskolleg* (vocational college) or the *Wirtschaftsgymnasium* (commercial high school). These types of schools increasingly have a functional link with the dual system, because higher education entrance qualifications in Germany (obtainable in general or in vocational education) are often used to get admission to high-level apprenticeship placements (e.g., in banking, insurance, or other commercial occupations) where companies are now becoming more selective and demanding (Jacob & Solga, 2015). It may be claimed, therefore, that this manifestation of "generalization" within the VET system is not necessarily endangering the dual system.

Second, vocational institutions in some countries offer "combinations of accredited general (academic) and vocational learning and attainment that formally qualify for entrance to higher education and the labour market" (Deissinger et al., 2013, p. 8). These "hybrid qualifications" function as a tool leading to a kind of generalization of vocational education. However, the quality of hybridity differs between countries. In the case of Germany, or Baden-Württemberg in particular, the vocational colleges have failed to produce labor-market-relevant qualifications besides higher education entitlements against a dominant and well-accepted dual system (Deissinger, 2007). Hybrid qualifications and their underlying educational programs are, on the one hand, located in the vocational context, but on the other hand remain mostly separated from apprenticeship training, which emphasizes their "general" or "scientific" character. Therefore, hybridity that is not linked to vocational training (like in Switzerland) undoubtedly has a stabilizing impact on the dual system. This means that, at least in some major occupational fields, employers prefer recruiting high-quality school leavers from the streams of upper secondary education to other applicants (Deissinger & Ott, 2016).

Third, the dual approach within higher education, and with it a specific manifestation of vocationalization, is now one of the most recent features of an increasingly differentiated higher education system in Germany. The so-called *Berufsakademien* (vocational academies that combine academic and practical training), now named "dual universities" (*Duale Hochschulen*) (Deissinger 2000;

Hippach-Schneider & Schneider, 2016), make higher education more applied to companies and workplaces as they trust in the participation of employers in the process of skill delivery in a very fundamental way. Although their share of new enrollments in higher education amounts only to some 4% (Jacob & Solga, 2015, p. 168), they clearly represent a new kind of structural expansion of the higher educational system as they copy the vocational principle and the alternating learning mode of the dual system. There is no doubt that the "dual universities" mark a successful convergence of vocational and tertiary education in the German context, even though their specific institutional and didactical concept rests on the foundations of the traditional dual system (Euler, 2014).

Fourth, another form of an "extension of vocational education into the tertiary sector" (Euler, 2014, p. 326) is due to the introduction of newly structured and staged study programs as a result of the Bologna Process. Most German universities and faculties (except for medicine, law, and theology) have embarked on these new or revised bachelor's and master's programs and qualifications, which also partly reflect an increasing vocational specification orientation (Euler, 2014). The Bologna Process certainly has potentially dangerous implications or consequences for the dual system. It might in the long run, in specific labor markets at least, speed up the replacement of graduates from the dual system with university (of applied sciences) graduates.

It needs to be added that these tendencies are culture-specific and nation-specific and have to be seen in the context of their respective political environment. It also seems that the German situation is unique in terms of the role VET plays in the process of academization by attracting young people with grammar school qualifications into the apprenticeship system, and by enabling vocational (full-time) schools to contribute to the number of school leavers eligible to progress to higher education. These oddities correspond with the uniqueness of the German apprenticeship system, which seems to be more of a strongly occupation-based system with a specific stakeholder configuration than a dual system (Deissinger, 2010). By this, I mean that the occupational basis of the system coupled with the strong role played by employers and chambers is the key characteristic of the dual system, notwithstanding the important contributions of vocational schools and vocational teacher education to the quality of training.

Comparative Perspective

Notwithstanding this chapter's critical arguments concerning the impact of academization on the dual system, there is not yet clear evidence that, despite stronger academic aspirations in German society and easier ways to proceed from primary education to the higher stratum of secondary education, higher education degrees have developed into serious alternatives to traditional vocational qualifications in many branches of the economy. It is likely that companies in the future will continue using different levels of qualifications, depending on the various functions in the company organization they have to serve. In some way, the so-called vocational academies have satisfied these aspirations. Since

the 1980s, the "dual universities" have been a kind of academic dual system. Dual higher education is still, however, a heterogeneous field. The Baden-Württemberg type (Deissinger, 2000) is a particularly sophisticated model as it offers bachelor's degrees based on a training contract with a company. It is likely that in Germany, pathways that resemble the dual system will remain or even become more attractive to employers. Also, the new types of university courses and specifications of graduate courses emerging with the Bologna system now seem more relevant within the political discourse than, for example, the issue of hybrid qualifications, which are definitely not a pivotal topic in education policy at the moment (Deissinger et al., 2013).

In most countries, dual systems in the narrow sense of the word do not exist, with the exception of Switzerland and Austria, which resemble the German model. The strongest of these certainly is the Swiss system, which has undergone some of the modernization the German system is still waiting for, including hybridity within the apprenticeship system (Deissinger & Gonon, 2016; Gonon, 2013). In the 1990s, the initiative to establish polytechnics and the debate on European integration led to the creation of the Federal Vocational Baccalaureate (*Berufsmatura*). This hybrid qualification offers both a labor-market-relevant formal qualification in the dual system and the entitlement to study at a university of applied sciences (Gonon, 2013). In Austria, there seems to be less social esteem for the apprenticeship system due to the overall importance of full-time VET (Deissinger, 2010). Against this background, the most traditional model of a dual system still exists in Germany and may be described as comparatively resilient to change.

When we consider Germany's historical experiences with its dual system, vocational training options may be measured along their allocating function as well as their career-inducing effects. At least when it comes to the quality dimension of vocational training *and* employer commitment, the dual system could be a model for other nations as it relies on general and broad profiles of occupational competence, which are not exposed to market principles unrestrictedly. However, it should be recognized that implementing a system, which conceives qualifications from a non-economic perspective, requires a structural environment of consensus as well as cooperation between various social groups.

Academization tendencies in Germany therefore have to be seen in a specific light. They have to be mirrored against the context of Germany's strong vocational tradition, both in the education system and in educational theory (Winch, 2006). At the same time, academic drift shows that in the future there could be a kind of convergence between different European countries, in the sense that apprenticeship runs the danger of becoming an ancillary system in comparison with universities. Hence, with respect to its sustainability, attempts to strengthen the dual system now face a new challenge as educational and economic rationality needs to be harmonized.

Whereas in some other European countries, such as the UK, where the balance between on-the-job and off-the-job training is variable across apprenticeships, in Germany there are mandatory requirements. It is noticeable that although there

is an ongoing discussion about the "process character" of vocational training in the UK, including the scope for more "expansive" approaches to training given the complexity of contemporary forms of work (Fuller & Unwin, 2003), in Germany the law provides the framework for a "dual" approach that keeps school leavers within the educational system. In general, it is unlikely that transplanting the dual system into other national and cultural contexts would prove feasible. At the moment, however, it seems that both "Roman" and "Anglophone" countries (e.g., Spain or Canada) express a serious interest in the dual system, although the motivation is different. In Spain, the driver has come from the need to combat high youth unemployment (Marhuenda, 2000), whereas in Canada apprenticeships, together with college-based VET, are seen as a (still weak) counterweight against the tradition of a firmly established "You have to get that degree" mentality. Also, here the focus is more on the content of apprenticeship rather than on the dual principle as such (Deissinger & Gremm, 2017; Lehmann, 2012; Taylor, Mehrabi, & Pillay, 2016; Wheelahan, 2016).

VET research should clearly focus on these issues when it comes to the sustainability of the dual system approach. Although many countries try to overcome meritocratic thinking and with it the devaluation of VET and company-based training in particular, Germany with its historically successful model of smooth school-to-work transitions (Jacob & Solga, 2015) faces potential dangers if it tries to copy the doubtful experiences of, for example, Anglophone countries. To assess the scope and impact of underlying social changes and institutional dynamics fostering meritocracy, however, we should have more empirical research on employers' attitudes toward and practices of workforce recruitment and also perceptions of young people concerning their future careers. On the other hand, the example of the "dual universities" in Germany shows that convergent developments between higher education and VET are possible and present politically intended alternatives to a binary thinking of these two spheres in the education system.

Conclusion

The recent shift toward academization may be seen as the reverse side of the still significant role of the dual system in the overall German educational context. In the light of increasing, although sometimes regionally diverging, numbers of high school graduates, the pendulum might swing even more in the direction of the academic sector in the future. Because of this increasing academization, potential apprenticeship starters (who hold a full or partial higher education entrance qualification and who would normally enter dual training as a credible alternative to higher education) could be diverted from a segment within the apprenticeship system, which has for quite a long time been attractive both for employers and for school leavers. Nevertheless, an impressive share of 27.7% of new apprentices who held a formal qualification in 2015 allowing them to go on to universities or universities of applied science is contesting this thesis. Some 70% of new apprentices in banking come from the upper level of general

or vocational education (Pilz, 2009). These features are quite unique for Germany, even if compared with Switzerland or Austria. This pattern of occupational orientation among young people underlines that, in contrast with other countries, "there is no stigmatisation in Germany of those trained within the apprenticeship system" (Pilz, 2009, p. 200).

Quite obviously, academization and tertiarization are as such more complex and multifaceted, especially from the point of view of the VET system with the dual system as its core institutional setting. Structural and didactical similarities and convergences between the two large educational subsystems (higher and vocational education) indicate that vocationalization is not fading, but has the potential to emerge in a new coating. Against this background and with respect to VET research exploring these issues, it seems that there is clearly a need for finding out more about attitudes and perceptions of young people, but also employers, when it comes to understanding pathways and transition routes of school leavers and the trade-offs between non-academic vocational training and higher education courses. It is still open to question whether academization in the German context is going to reach the level of countries such as France or Canada (Deissinger & Gremm, 2017), given the traditionally high value and reputation of vocational training in German society.

However, if this scenario became reality, the function of the dual system as a blueprint for other countries, notwithstanding the problem of its cross-national transplantation, would be foiled by the seemingly dominant power of "meritocracy" undermining its sustainability. Another key issue for research is the tendency for pathways into employment to no longer appear as imperatively linear because "hybridity" has been entering the stage in various shapes, merging institutional structures and didactical principles alike and letting people decide to combine, both intentionally and unintentionally, academic and vocational achievements, courses, and certificates (Jacob & Solga, 2015). Apart from the general trend toward academic achievements in society, such tendencies also have the potential of taking away from the dual system its paramount relevance and visibility in the German educational context.

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16

Duality and Learning Fields in Vocational Education and Training: Pedagogy, Curriculum, and Assessment

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Introduction

This chapter explores the concept of duality in vocational education and training (VET). This is understood in many countries to provide the optimal basis for organizing VET programs, although the degree to which this is achieved in practice varies considerably. The chapter explores the challenges in achieving duality through the lens of the German dual system. It addresses the relationship between theory and practice and approaches to curriculum development, VET pedagogy, and assessment. It also discusses related issues, including the assessment of competencies rather than knowledge or skills and the use of technology in assessment.

Although *assessment* is fairly consistently defined as the examination or testing of knowledge, skills, aptitudes, or competencies, the terms *curriculum* and *pedagogy* have been much more fluid over time and across differing countries. Definitions of *curriculum* range from a planned or prescribed list of subjects to a more dynamic notion of something that is constructed and critiqued by teachers and learners during the learning process (Marsh, 2009; Darder, Baltodano, & Torres, 2003; see also Chapter 3, this volume). In this chapter, we discuss a key curriculum concept for VET in Germany ("fields of learning"), which has replaced a subject-based approach. In English-speaking countries, the term *pedagogy* relates to the theory and practice of teaching and learning (Canning, 2011; Elliott & Norris, 2012), whereas in German-speaking countries, it is used more broadly to refer to discipline-based teaching and the practice of education and training in all areas of society. In this chapter, we shall use the term *pedagogy* to include all aspects of teaching and learning in relation to VET such as curricula, learning objectives, methods, media, and so on, even though these areas would more usually be referred to in German as *Didaktik* (Doyle, 2017; Pahl, 2014).

We argue that the German experience has relevance as a test bed for trends in VET from which other countries can learn by understanding its mistakes (avoiding errors of planning and implementation) as well as its more positive achievements.

The Concept of Duality in Germany VET

This dual system of vocational training (Bosch, 2010; Fürstenau, Pilz, & Gonon, 2014; Gonon, 2014; Greinert, 2007; Pilz, 2016; see also Chapter 15, this volume) is widely defined by its combination of two learning locations—the training company and the vocational school. Depending on the occupation and on the apprentice's prior learning, training takes between 2 years and 3 and a half years. They spend around two thirds of their time in the company, with the remaining third being spent in the vocational school on a part-time or block basis. During the periods spent in the vocational school, apprentices acquire occupation-specific skills, but also receive compulsory general education in the areas of politics, German, foreign languages, sport, and religion.

It is widely considered to be the case that the training company teaches practical knowledge and related skills and aptitudes, whereas the vocational school focuses on theory and on specialist technical knowledge. This is, however, a simplification, as the teaching at both learning locations is multidimensional (see also Chapter 21, this volume). For example, vocational schools have training workshops for craft occupations and make wide use of simulations to deliver a substantial practical element alongside more theoretical content, such as knowledge about business law, accounting or technical maths, and technical drawing. Practice is also firmly embedded in the curriculum. Since the early 1990s, curricula and pedagogy in vocational schools in Germany are no longer organized on a subject basis, but based on so-called *fields of learning* (*Lernfelder*), which are geared to the wide-ranging and problem-based activities that apprentices will encounter as they learn the full range of skills needed to plan, carry out, and monitor tasks. Bauer and Przygodda (2003) explain,

> The key purpose of learning fields is to link the curricula and ultimately the learning processes to the work activity and simultaneously to promote action learning at the curricular level. Action learning in VET schools has to be holistic, situated and contextualised and should support experience making. Therefore, the reference to the learning process via learning fields is related to a complete work activity with self-directed planning, execution and evaluation of the action while also taking into account interdisciplinary aspects (e.g. technology, economics, ecology, law, etc.). The challenge for curriculum developers and VET teachers is to identify occupational situations which are significant for the work activity and also have a potential for learning. (p. 24)

This takes vocational school curricula and teaching much closer to the everyday practice that apprentices encounter within companies.

Besides the learning location, duality is also reflected in other ways. Every apprentice has a training contract with his or her training company that is approved by the relevant authority (such as a Chamber of Crafts or a Chamber of Commerce and Industry). During the training period, young apprentices receive a training allowance from their training company. At vocational schools, apprentices have a formal student status and are, therefore, subject to attendance requirements, relevant legislation, and framework curricula. During the periods that they spend within their training companies, however, they are subject to the relevant training regulations, which set out not only the content of the training program but also apprentices' rights and obligations. They are also subject to relevant legislation, including the Youth Employment Act. Moreover, there is a dual aspect to the status of the staff who deliver vocational training: Within companies, trainers (approved and recognized by the chambers) are responsible, whereas in vocational schools, training is delivered by specialized VET instructors, most of whom have been trained to the master's level. The training of VET teachers in Germany is equivalent to the training for teachers at a *Gymnasium*, the most academic secondary school type in Germany. Following a 3-year undergraduate degree, future teachers normally complete a 2-year master's course at a university. As well as training in their specialist subject (e.g., metalworking, health care, or business and management), many also study a further general educational subject (e.g., German, mathematics, or politics) along with the principles of teaching their specialist subject. Remuneration of VET teachers is the same as for *Gymnasium* teachers. As a result, Germany attaches great importance to providing VET teachers with wide-ranging training and preparation covering their skills in specialist technical subjects, teaching methodology, and practical classroom skills, with the aim of achieving high-quality training within vocational schools (see also Chapters 17 and 21).

The selection and recruitment of apprentices are solely the responsibility of the training company, which meets the full costs of training. Vocational schools, which receive their funding from the individual federal states and are accountable to them, are required to teach all apprentices taken on by these companies. Training courses culminate in a final examination and, for successful candidates, a certificate issued by the responsible authority. Apprentices also receive a training certificate from their training company and a certificate from the vocational school, which may also list general education qualifications achieved (for instance, a school-leaving certificate in one of the forms recognized by the German education system). Successful completion of a course of VET forms the basis for entry into the world of work and into a job governed by collective agreement.

To ensure the development and management of the complexities of the dual system, a range of stakeholders collaborate in keeping training occupations up to date. The training regulations for companies and the framework curriculum for vocational schools are developed jointly by employers' associations, trade unions, and the relevant federal and state-level ministry under the oversight of the German Federal Institute for Vocational Education and Training (BIBB). This consensus procedure ensures wide general acceptance of Germany's dual training model.

Influences on the Development of VET Pedagogy and Assessment

Since the mid-1980s, there have been a number of initiatives in Germany, just as in many other countries, to reform and adapt VET pedagogy, curriculum, and assessment. A number of motives are evident in these initiatives. Demographic trends and economic globalization are having far-reaching impacts on occupational, personal, and social contexts. To greater or lesser degrees, many countries are seeing shifts in the balance of migration (triggered, among other factors, by increasing inflows of migrants); the globalization of markets and centers of production; the international availability of labor, information, and capital; and global competition. A further factor is the increased use of and dependence on technology and reliance on environmental and other resources. Companies have made their hierarchies leaner, digitalized or automated many business processes, and turned their attention to change management. As a consequence, companies need well-trained and skilled workers with both specific technical and electronical skills and a good level of underlying knowledge. These individuals also need to be able to analyze and interpret (big sets of) data, to tackle complex issues and work in teams, to be creative and innovative, and to have both intrapreneurial and entrepreneurial skills, among other requirements (Mayer & Solga, 2008).

In Germany, evaluations of curricula and of teaching and learning materials for use in both vocational schools and companies have shown that they were already in need of reform in the late 1960s. Problems were identified in curricula in relation to the volume of material, the linear nature of content and learning goals, and the lack of both practical and theoretical relevance. In particular, there was criticism that apprentices were left to form their own cognitive connections and discern their own cognitive structures, and were considered, therefore, to be inadequately prepared to cope with modern work structures and organizations (Fürstenau, 2003). Teaching and learning processes in vocational schools have tended to be markedly teacher-centered, with passive behavior and mainly receptive processes on the part of students. Moreover, teaching has tended to be largely verbal and abstract with little relevance to concrete situations, hampering the development of specific concepts or the development of cognitive structures to underpin practical actions. This kind of instruction may be efficient in terms of enabling apprentices to memorize individual pieces of knowledge, but it is comparatively inefficient in achieving self-regulated and active learning and application of knowledge (Schank & Cleary, 1995). Companies face difficulties because the apprentices are often given only routine tasks to complete. In many cases, apprentices become only partially familiar with complex business processes and are not allowed to take responsibility. The full learning potential of the workplace is not exploited, and apprentices are not adequately prepared for their future employment (Achtenhagen, Nijhof, & Raffe, 1995).

Closely related to the design of teaching and learning processes is the fact that the German dual system has virtually no access restrictions, making the student body very heterogeneous. However, it should be noted that some occupations tend to be chosen by those with the *Abitur* (school-leaving certification required

for access to university), whereas others are more popular with academically weaker students. Nevertheless, of the training contracts concluded in 2012, fewer than 3% involved young people with no school-leaving qualifications, whereas around 25% of new apprentices had qualifications that entitled them to go on to university (BMBF, 2014, p. 24).

These trends in the reference system for vocational training and existing evaluations and research findings made it essential to review the goals and content of training, curriculum design, teaching and learning processes, and assessment. Those instigating such reviews have been the stakeholders involved, particularly companies, trade unions, or policymakers in the area of VET. Researchers in this area are also investigating the extent to which specific training and learning environments and curricula remain the most relevant ways of achieving technical and functional skills development for future employees as well as contributing to their education. The overarching (normative) goal, commonly agreed upon, has been that students and apprentices should acquire *Handlungskompetenz*—vocational action skills—which should be understood as the skills of planning, carrying out, and monitoring a series of new actions appropriate to specific situations. From a normative perspective, *Handlungskompetenz* can be subdivided into technical competencies, social competencies, and self-competencies. This shows that the concepts and terminology are based on a German understanding and are difficult to convey in English (see Winterton, 2012): as Brockmann, Clarke, and Winch (2009) argue, "The German concept *Handlungskompetenz* includes a social, moral and civic dimension and integrates various aspects of competence within an occupational context" (p. 793).

The aim of *Handlungskompetenz* is to help employees carry out their chosen occupation and to make a social, economic, and environmental contribution to shaping the world of work and society more generally. Curricula, teaching and learning processes, and examinations should be designed to reflect this, with curricula structured around "fields of learning" rather than narrower "subjects." Teaching and learning processes should facilitate the acquisition of *Handlungskompetenz* and be accordingly action-oriented (Achtenhagen & Grubb, 2001). It is, therefore, important to enable students and apprentices to act holistically in the form of complete actions, including planning, implementation, and monitoring. The concept of action orientation is also characterized by a high level of self-management of learning processes by the learners themselves. This makes it important that VET reflects the heterogeneous nature of the student body. Changing the role of teachers, from lecturer to learning coach, and enabling students to learn from mistakes are further characteristics of this approach. Examinations should be designed to be tailored to the normative goal of securing *Handlungskompetenz* rather than, as often now, testing factual knowledge.

Pedagogy and Curriculum

Issues of learning and teaching were crucial to the craft guilds of the past. Initially, apprentices learned primarily through observation, watching an expert, imitating his or her actions, and receiving feedback on working processes. However,

when vocational schools were introduced in Germany, spearheaded by the nineteenth-century educationalist Georg Kerschensteiner, occupational learning processes began to be increasingly systematized (Gonon, 2012). The German Vocational Training Act of 1969 gave vocational schools in the country a clear pedagogical responsibility.

As we indicated in this chapter, the main concern of VET in the German context is to provide a broad-based training that goes well beyond the teaching of partial skills and also deliver a general education (Deissinger, 2015; Greinert, 2007). Thus, as well as teaching vocational competencies according to *Lernfelder*, vocational schools in Germany also teach German and foreign languages, politics, religion, and sport. The teaching that vocational schools provide must, therefore, strike a balance between delivering the specialist skills that training companies need on the one hand and providing a broad vocational education for the young people enrolled in them on the other.

With regard to curriculum development theory, Reetz (1984, 2003) differentiates between three different principles of selecting and determining curriculum objectives and contents:

- The discipline principle (*Wissenschaftsprinzip*)
- The situation principle (*Situationsprinzip*)
- The personality principle (*Persönlichkeitsprinzip*).

Reetz's theory is in line with other international approaches to curriculum development (e.g., Pilz, Krisanthan, Michalik, Zenner, & Li, 2016; Schiro, 2008). According to the *discipline principle*, the main rationale in determining the curriculum objectives and contents is that the "scientification" of life and today's world makes it necessary to orient learning content, together with its structure, toward the respective scientific discipline(s) and systematic knowledge. The *situation principle* argues that the reality of students' working life should be the benchmark and center of reference in curriculum development and that learning should be based on their contemporary and future life situation; the object and content of the curriculum should, therefore, be the knowledge, skills, abilities, and competencies that are relevant to and required in the life situation. The justification of an educational aim based on the *personality principle* stems mainly from one of the following two sources: (a) consideration of the rights and demands of learners; and (b) the development of certain competencies (especially key competencies) and personality aspects that enable individuals to deal with problems in various life domains, whether private or vocational.

In German vocational schools, therefore, curricula provide teachers with a robust orientation. Each training occupation (see above) has a syllabus that outlines goals and content. Over recent years, syllabuses have been designed to be competency-oriented and to include complete performed actions as seen in everyday work. This is achieved through *Lernfelder*, which in turn are transformed by the teaching staff into learning situations to form the basis for concrete teaching and learning (Sloane, 2014). The macro and micro-sequencing of teaching is of particular importance in this context. In traditional vocational school teaching, macro-sequencing usually moves from the simple to the complex, where *simple* represents discrete knowledge of a particular subject that

is deepened by stages. In action-oriented teaching, by contrast, *simple* is interpreted as existing understanding of an elementary unit, which demonstrates the fundamental connections within that subject. These connections are then further elaborated as the course proceeds. In relation to micro-sequencing, it has traditionally been common for explanations of concepts to be wholly abstract. In action-oriented teaching, by contrast, the recommendation is that teachers establish links between abstract knowledge and its practical application, deriving abstract concepts from specific, concrete cases and then applying them in new contexts. Thus, the sequencing moves from the concrete to the abstract and then back to the concrete again.

The following case study documents one small part of the syllabus for the training occupation *industrial clerk*, which is structured in 12 *Lernfelder* (Table 16.1).

Analysis of this *Lernfeld* illustrates that the pedagogical intention emerges largely from the description of the competencies required. It also demonstrates the complete sequence of actions described here. For example, ordering

Table 16.1 Learning field 5 from the vocational school curriculum for industrial clerks.

Learning field 5: Planning, managing, and monitoring performance processes	Year 1 of training Timeframe: 80 hours

Goals

Apprentices describe and justify a production or service provision program in relation to the sales market and the company's core processes, manufacturing or performance processes, and cost structure. They consider sustainability as reflected in the environmentally friendly use of materials and energy. They assess manufacturing and performance processes from a health and safety perspective.

As part of inventory control, they use existing stock lists or performance characteristics to gauge requirements for a customer order. Where parts or services are sourced from outside the company, they make suggestions for ordering, taking consideration of timetables for restocking and estimated consumption.

Where parts are produced in-house, they use technical data to analyze product structure and compile parts lists and work plans. They also plan manufacturing orders based on this analysis, dispatch manufacturing orders according to available capacity and existing priorities, and describe the options for following-up and monitoring orders.

As part of quality management, apprentices explain the process optimization procedures that will ensure and improve product or service quality during the product manufacture or service delivery phase.

In carrying out a range of tasks, apprentices make use of appropriate IT systems to monitor and update the necessary data.

Apprentices work in teams to solve problem-based tasks. They document their results and are able to present them. They reflect on the progress they are making in their learning and develop learning strategies.

Content
Product manufacture
Production planning and management—framework and processes
Production monitoring—costs, quality, and deadlines
Avoidance of waste and recycling

Source: KMK (2002, p. 12, authors' translation).

processes are not taught in isolation but within the context of needs assessments and subsequent use of data systems for monitoring.

German debate about the planning, implementation, and reflection on teaching within VET regularly centers on pedagogical models. A range of models focus specifically on VET (Sloane, 2014), but VET practice frequently makes use of a model from general education in Germany. This approach, known in practice as the *Berlin model*, identifies four areas of decision making for teachers: the intention (goals) of teaching and its content/themes; and the methods and the media used. We now use this structure to explore vocational teaching in practice.

Vocational Teaching in Practice

Vocational teaching and training in Germany have traditionally been dominated by the discipline principle (as discussed in this chapter). In many cases, this has led to the volume of material being too unwieldy to teach and limitations being imposed on content so as to provide relevant examples. Even now, content is still sometimes being reduced and modularized (Pilz, Li, Canning, & Minty, 2018). A very broad range of methods and media are used in vocational training, which differs between craft/technical occupations and commercial/administrative occupations. The forms of action engaged in by teachers in vocational schools regularly include elements familiar from general education, such as lectures, guided stimuli, and student responses to teachers' questions. Social forms may include classwork, individual work, pair work, or group work. The action form and social form that an individual teacher ultimately selects depend crucially on his or her intention as well as on factors such as the way the classroom is equipped and arranged and the students' prior learning.

A range of large-scale pedagogical arrangements are also used. In training for commercial occupations, these include, in particular, case studies, project work, "learning offices," and practice companies. These arrangements have a particular significance in full-time vocational education in German schools (that is, outside the dual training system), because their students lack the chance to gain practical experience in a company. In the technical occupations, "learning circles" and work conducted in the school's teaching workshop are particularly important. Using case study methodology and working with case studies are not recent phenomena and have long formed an integral part of university training in disciplines such as economics. As situation theory approaches were increasingly being used in both pedagogy and curriculum design, the case study as a tool for tackling complex issues through real-life manifestations gained popularity and, by the 1980s, become an integral part of the methodology for teaching business studies in VET in Germany.

The pedagogical dimensions of teaching in vocational schools presented here must be seen in conjunction with the learning activities that take place in training companies: Holistic training in the dual system is crucially based on coordination between these two learning locations. Indeed, there should ideally be intensive coordination of the competencies being taught throughout the period of training. In practice, however, coordination of content between learning locations tends to be at a general level and sporadic in nature (Euler, 2013). Limiting factors

include, for example, the material fact that a class in a vocational school generally includes students from differing training companies, which restricts the timing of various aspects of training and so limits the coordination of content: Learning is, therefore, staged differently, and content varies, from one company to another. Nonetheless, the binding regulations on *Lernfelder* in vocational school training for a specific cohort and the coordinated content of training to be provided within companies as documented in the training regulations provide at least a minimal framework for coordination between learning locations.

One further aspect is of relevance here. The joint development and coordination of curricular content for the two learning locations (companies and vocational schools) and the practical orientation of teaching within vocational schools (see above) mean that training companies acknowledge the need for and value the contribution that vocational schools make to training (Berger & Pilz, 2010; Pilz, 2009). Moreover, although in isolated instances companies complain of occasional shortcomings in the teaching provided by vocational schools, there is general acceptance by all stakeholders of the benefit of the second learning location (the vocational school) under Germany's vocational training system.

VET Assessment

It should be borne in mind that in the German dual vocational training system, examination and testing take place both in the vocational school and in the training company. Particular importance is attached to the interim and final examinations. Final examinations in a vocational training context enable apprentices to access employment and different tracks of the general and VET system. We begin with an overview of the historical development of assessment before presenting the regulations and responsibilities governing examination and, finally, discussing the design of examinations, recent trends, and the relevance of the German debate to the international context.

When craft guilds first began vocational training for workers, assessment-based examinations were unusual. Apprentices' final qualification was more likely to take the form of a social performance: Completion of their apprenticeship and the start of their period as journeymen were marked by a discharge from their teachers, whereas the transition from journeyman to master craftsman was marked by a formal recognition as a master craftsman. In both cases, the supervising master craftsman vouched for the apprentice or journeyman's mastery of the customs and practices of the guild before guild members. With the rise of industrial occupations in the nineteenth century, examination gained in importance as a way of assessing technical skills and knowledge. These examinations made it possible to assess craft skills through external bodies, thus also improving the status of craft occupations. Craft workers took their examination before guilds, federations, trade associations, and so on. The content of the vocational school syllabus could be included, although this mainly satisfied the requirement to ensure that master craftsmen were sending their apprentices to the vocational school. It was not until Germany passed its Vocational Training Act in 1969 that examinations became compulsory.

The Vocational Training Act, also known by its German abbreviation BBiG, was substantially amended in 2005 and governs the examination system for vocational training. The relevant regulations for craft occupations are laid down in the Craft Code, with further relevant legislation including the training regulations and the examination regulations of the appropriate training and examination bodies (e.g., Chambers of Commerce and Industry). The training regulations are a key regulatory mechanism for the responsible bodies and for the examinations they carry out. Under the Act and the relevant training regulations, most training occupations require apprentices to pass an interim examination and a final examination. The interim examination enables apprentices' level of training to be assessed and takes place about halfway through the second year of training (i.e., around the midpoint of their training). However, it has no relevance to whether apprentices pass or fail their final examination. Where appropriate, the final examination may be taken in two parts administered at different times, in which case there is no interim examination. The final examination is designed to establish whether the candidate has acquired the vocational skills, knowledge, and expertise for the relevant training occupation and is familiar with the key content of training. Passing the final examination endorses the candidate's qualification for employment and also opens the door to formalized continuing and in-service training.

The organization of interim and final examinations is the responsibility of the appropriate authorities, which convene boards of examiners. A board of examiners must comprise at least three members, who must include at least one vocational school teacher and an equal number of employer and employee representatives; these representatives must account for two thirds of the total number of board members. The relevant authority must pass examination regulations for the final examination, which must then be approved by the highest relevant authority at the federal state level. These examination regulations govern, among other aspects, the structure of the examination and the criteria for assessment. Each set of training regulations determines the content of the final examination.

Vocational schools play a subordinate role in relation to interim and final examinations, but since its most recent amendment, the Vocational Training Act now provides for the board of examiners to solicit expert opinions from third parties, and in particular from vocational schools, to assess non-oral examination performance in individual areas. Within the dual system, the vocational school is an independent learning location whose role is to teach occupation-based and more general competencies and equip apprentices not only to exercise a particular occupation but also to contribute to shaping the world of work and society more generally. Vocational schools issue their own qualifications to apprentices who have performed at least adequately in all subjects or areas of learning. Depending on the regulations of the relevant federal state, the final certificate may also include one of the two lower-level secondary school-leaving qualifications, the *Hauptschulabschluss* or the *Realschulabschluss*.

Using the training occupation of *industrial clerk*, as described in this chapter, as an example, we shall now illustrate the regulations governing the interim and final examinations. The interim examination is a written examination lasting a

maximum of 90 minutes, and it involves candidates in practice-related tasks or case studies. It covers the following areas: (a) procurement and stock management, (b) products and services, and (c) cost and performance accounting. The final examination involves written questions in four areas and also involves a presentation and a technical discussion on a specific area of deployment (Table 16.2). This area is determined by the training company and may relate to processes and procedures in the areas of marketing (e.g., export and advertising), procurement and stock management (e.g., warehouse logistics), human resources (e.g., payment systems), performance (e.g., work planning), service accounting (e.g., cost calculation systems), or "other roles" (e.g., customer projects).

In vocational schools, teaching is arranged by subject, *Lernfeld*, or field of action. These units with thematic coherence are linked to specific learning goals, content, and time guidelines and are assessed in writing (e.g., through course assignments), orally (e.g., through short presentations or participation in class discussion), and/or practically (e.g., through samples of work). The number and weighting of these assessments are set by an expert panel at the beginning of the academic year using pedagogical criteria, and they are notified to students. The relevant federal state's regulations for vocational schools provide more detail.

Discussion of examinations currently focuses on a number of areas. One is the value of final examinations taken in vocational schools. The Vocational Training Act created scope for the first time to accredit academic qualifications toward the final examination. Another area of debate is whether examinations should follow the same standards across the country to ensure comparability and to boost the occupational mobility of former apprentices, regardless of whether they are regional or sector-specific examinations and whether the holders have taken them in vocational schools or in training companies. Discussion also centers on whether, and how, formative assessment in support of learning should be recognized.

However, the main cause of criticism has been the fact that examinations are not practice-based and that they focus on the assessment and reproduction of small areas of fact-based knowledge in a multiple-choice format. Even the examinations that claim to be practice-based have attracted criticism for being a technical discussion of one specific task in the form of an assessment of what the candidate knows. In particular, the move to action-oriented forms of training in the 1980s and the shift toward developing more broadly based vocational competence have required examinations to be more broadly based and designed to assess vocational *Handlungskompetenz*. They need to be tailored to real-life tasks and actions, rather than to thematic areas, and require apprentices to plan, carry out, and monitor entire sequences of actions. Examinations should also cover not only technical areas but also human and social areas.

Since the 1990s, a number of research projects have focused on developing action-oriented examinations that more successfully assess apprentices' vocational competence. Assessing competencies is the subject of both conceptual and methodological debate (see Chapters 4 and 6, this volume). The Association of German Chambers of Commerce and Industry, formerly known as DIHT, piloted and funded a scheme called KoPrA (Komplexe Prüfungsaufgaben für Bürokaufleute, or Complex Examination Tasks for Office Administrators), in

Table 16.2 Content and structure of the final examination in the "industrial clerk" training occupation.

Area of assessment	Format/content	Aims	Duration	Form
Business processes	Situational tasks or case studies based on complex content from one of the following areas: • Marketing and sales • Procurement and stock management • Human resources • Performance	• Analysis of business processes • Developing results- and customer-oriented solutions to problems	3 hours	Written
Commercial management and financial control	Up to four practical tasks from the area of service accounting, including financial control	• Recording costs • Analyzing cash and value flows • Using these data to draw business conclusions	1.5 hours	Written
Business and social studies	Practice-related tasks	• Describing and assessing general business contexts in the candidate's occupation and employment	1 hour	Written
Area of deployment	Tackling a specialized task	• Mastering a complex specialized task and integrated business processes • Solving practical problems • Explaining issues, processes, and outcomes in relation to the specialized task and describing it using conventional tools • Placing a specialized task in its overall context, explaining the background, and evaluating outcomes • Mastering the processes involved in managing a specialized business area	10–15-minute presentation 30-minute technical discussion	Oral presentation on the basis of a five-page report Technical discussion

Source: IndKfmAusbV (2002; authors' own translation).

which, for example, individual tasks were embedded in real-life working situations. Apprentices had to undertake broad-ranging actions from planning to monitoring and make use of the full range of documents and resources available to them in a working situation. The Federal Ministry of Education, Science, Research and Technology, the vocational-training arm of the German insurance sector, and the DIHT also ran a pilot scheme for the insurance industry between 1997 and 1999 to devise action-oriented examinations.

The most recent work toward developing competency-based tests involves a research initiative supported by the Federal Ministry of Education and Research between 2011 and 2014 and known as ASCOT (Technology-Based Assessment of Skills and Competencies in VET). This initiative aims to assess performance in a construct-oriented way, with the construct of vocational *Handlungskompetenz* being defined to include skills at three different levels: occupation-specific, broader employability (e.g. social and communication skills), and general (e.g. mathematical and scientific skills). As well as modeling competence, ASCOT aims to measure performance in an objective, reliable, and valid but also cost-effective way. It also seeks to establish a link between occupational skills on the one hand and general skills and institutional and individual factors on the other to explain possible differences between apprentices in performance terms. The ASCOT initiative has generated a series of findings that point the way to substantial potential for new and innovative solutions to modeling and recording competencies. It is not yet clear to what extent newly developed instruments will be put into practice.

Both internationally and within Germany, the central question is what types of assessment are appropriate, which institutions and/or individuals should conduct assessment, and which bodies should accredit assessment results. The relationship between vocational school–based and company-based assessment requires clarification. Further challenges arise in relation to the recording, evaluation, and certification of competencies acquired informally and to the accreditation of prior learning. Closely linked to this is the issue of where to site competencies acquired through VET within the national and European qualifications frameworks and, hence, of the international comparability of qualifications (Raffe, 2013).

Looking Ahead

In this chapter, we have explored the complex nature of curriculum, pedagogy, and assessment and the concept of duality in relation to VET, with illustrations from the German context. Within the constraints of a book chapter, we are limited by the extent to which we can discuss the new ideas that are affecting the way VET is being delivered. Alongside the topics mentioned, one major reality continues to pose a considerable challenge for curriculum, pedagogy, and assessment within VET systems around the world and, hence, for VET teachers and trainers. That reality is the diversity of participants in VET.

Because the German training system does not require any particular prior academic achievements and does not impose age restrictions, the question of

differentiated teaching and individualization of learning processes within vocational school teaching has been a major focus for some considerable time. As well as catering to apprentices' differing levels of prior academic education, vocational schools may have young people who have dropped out of education sharing a classroom with those who have the qualifications to go to university or even students who have begun and then dropped out of a university course. The age of learners is, therefore, an important factor. Differing routes into the training system mean that any single vocational school class may accommodate students from ages 15 to 30. Account also needs to be taken of the fact that students bring very differing levels of prior education to their vocational school training and are supported to differing levels in their training companies, reflecting diverse learning conditions in these companies.

Germany has ratified the UN Convention on the Rights of Persons with Disabilities, so there has recently been an increase in the number of young people requiring special support in mainstream vocational school classes. This pedagogical challenge also requires particular attention. However, the greatest current challenge is the integration of young people from a migrant background. As a result of demographic change and a favorable economy, Germany has a shortage of skilled workers, a situation that is particularly advantageous for young people who have previously had poor prospects in the labor market, for example because of their lack of language skills. The current situation offers these young people relatively good opportunities of finding a training post. The same applies in principle to the current wave of migrants from the Middle East and North Africa (Esser, 2016). However, their integration into the system poses challenges for several reasons, including their heterogeneous cultural and educational backgrounds and lack of language skills.

It will be particularly important in future that the specific pedagogical skills of teachers in vocational schools are developed and promoted through in-service training and changes in the initial degree-level training of future teachers. For example, the federal state of North Rhine Westphalia is currently introducing a compulsory module in German as a second language into the curriculum for all university-level apprentice teachers. On the basis of this current set of problems, it is evident that it is no longer solely the pre-apprenticeship system that certifies young people's ability to embark on and successfully complete training, but that the dual system of vocational training itself also contributes to this role. Teachers and apprentices within the dual system therefore need to develop the skills to teach or benefit from general education, too, with the boundaries between the general education system and the VET system becoming fluid. Vocational school teachers are being prepared for this by studying, in most cases, a general education subject as well as their occupational specialism (e.g. business studies or metals technology), meaning that general and vocational aspects are interlinked in their own training. Nevertheless, dealing with the huge diversity of apprentices remains problematic, both within vocational schools and in training companies.

To tackle the challenges discussed in this chapter and, in particular, in relation to sustaining the concept of duality in VET, it is not enough to concentrate on the systemic level—providers and policy influences. Attention must be focused on the teaching and learning processes within vocational schools and training companies.

For some time, the challenges in relation to pedagogy and assessment have been the acquisition and measurement of vocational *Handlungskompetenz.* Specific issues in the area of pedagogy include the appropriate training goals (or goal systems) and training content. A key aspect is whether curricula are structured according to competency-oriented objectives or learning fields. Consideration also needs to be given to the question of appropriate skills acquisition methods: Alongside traditional methods, action-based processes (e.g., case studies) are being investigated in particular and, most recently, also technology-based training approaches. In relation to assessment, the question is how assessment and examination processes need to be designed if they are to measure broader skills and not merely factual knowledge or simple procedures. Assessment must therefore be compatible with developments in the field of pedagogy and, specifically, the issue of how assessment can be made technology-based.

To enable it to tackle the challenges of the future, VET needs to engage not only education and training policymakers but also VET researchers, who have to find answers to the questions raised here. Consequently, Germany and other countries need to think about how to successfully boost VET research from an institutional and financial point of view and about the areas it should cover. Unlike many other countries, Germany has access to a diverse and wide-ranging network of research activities in the areas of pedagogy and assessment. These activities are run by more than 100 tenured professors of VET teacher education at German universities, by the BIBB and its research departments, and by a number of other research institutions, including those run by employers, trade unions, the chambers, and private foundations and providers.

The current debate in Germany relates particularly to concrete training processes within companies. They are independent of Germany's specific vocational training system and may therefore offer impetus for other countries. Ultimately, specific training processes are the key to achieving quality and to satisfying all parties both in innovation within an individual vocational training system and in potential intercountry system transfers.

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17

VET Teachers and Trainers

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Introduction

There is a "largely unquestioned consensus" (Wolf, 2004, p. 315) that the right kind of educational policies can enhance a nation's economic position and never more so than since the global financial crisis that erupted in 2007–2008. Although this consensus has only a weak foundation at best, those working in all areas of education and practitioners working in vocational education and training (VET) in particular have been tasked with increasing "workforce participation, productivity, skills and social inclusion" (Wheelahan & Moodie, 2011, p. 12). Some of the responsibility for economic growth and social justice that has been placed on vocational teachers and trainers may be unreasonable, but they are certainly central to the successful development of a nation's workforce. As Grollmann (2008) notes,

> In most industrialized countries, some two-thirds of the workforce that constitutes the backbone of the economy are intermediate-level workers and employees, who have learned a substantial part of their occupational skills and knowledge through the support of teachers, trainers and instructors in the domains of non-academic technical vocational education and human resources development. (p. 535)

Although there is international consent about the importance of VET in policy, if not always in policy enactment, there is disagreement about how to refer to those working in the different national systems. This chapter adopts the term *practitioner* for all teachers, trainers, instructors, and others with an educational or training role in VET. Following Robertson (2008, p. 1), it will distinguish between VET teachers based in education and training institutions and VET trainers based within other organizations and enterprises that do not have the primary focus of education and training (i.e., mainly company-based trainers).

The practitioners within those categories are, however, far from homogeneous, as is discussed in this chapter. Nevertheless, some commonalities are apparent among VET teachers and trainers working in quite different situations around the world, and among these shared experiences are, perhaps most strikingly, "constant change and relatively modest status" (Billett, 2009, p. 1176). To these two troubling experiences can be added the fragmentation of VET, which is evident in the wide variety of ways that VET practitioners' jobs are delineated in terms of the context in which they work, their involvement in initial or continuing VET, and the theoretical or applied content of their teaching or training (Misra, 2011; Organisation for Economic Co-operation and Development [OECD], 2010). Grollmann (2008, p. 536), for example, distinguishes by their function five different types of vocational teacher or trainer in European contexts:

- Teachers or lecturers working in formal school or college settings and providing instruction in vocational courses
- Instructors and laboratory assistants working in school or college settings in vocational laboratories, who teach with a high degree of autonomy or sometimes act as assistants to other vocational teachers
- Trainers, tutors, and others in enterprises who integrate training and education functions into their jobs to varying degrees
- Instructors and trainers working in labor market training institutions supported by governments and public authorities, often with a strong focus on social inclusion and basic occupational competences
- Instructors and trainers working in employers' organizations, such as chambers of commerce, sectoral training institutions, or privately owned training companies and providers that focus on upgrading technical competences, training in communication skills, and so on.

These functional, rather than legalistic, descriptors are echoed by the European Centre for the Development of Vocational Training (Cedefop, 2009, p. 114), but they necessarily elide the heterogeneity of what individual VET practitioners do. However arbitrary these distinctions between roles may appear, they can still determine hierarchical order as well as salary. For example, in English colleges of Further Education (FE), those on instructor-type contracts that nominally do not include class preparation are routinely paid a third less than those on teaching contracts in the same institutions. Kemmis and Green (2013, p. 104) have identified internationally VET practitioners' "constantly and rapidly changing" responsibilities to:

- Equip individuals with broad-based skills and knowledge.
- Prepare very diverse learners for the modern labor force, and to adopt new and valued approaches to skill development.
- Demonstrate industry currency and develop close partnerships with industry, so education and training are closely linked to industry needs.
- More effectively link formal, nonformal, and informal learning.
- Facilitate movement of workers with low skill levels to higher skill levels.
- Improve levels of participation of those with low skill levels.
- Tailor provision to the distinctive needs of enterprises.

This list is probably not comprehensive, but the intention of this chapter is not to produce an accurate taxonomy of VET trainers' and teachers' functions. Rather, it seeks to better understand their role, their position, and their agency. Although written from an English perspective, it will draw on relevant international policy and research to argue that the situation of VET practitioners is best understood in relation to the economic cycle and to the unequal societies in which they work. This positioning simultaneously exposes them to frequent policy change and circumscribes their agency.

It is important to note that the scope and level of analysis outlined in this chapter are restricted to what has been published in English. Despite their evident centrality to the organization of VET systems, teachers and trainers are largely absent from international research despite a burgeoning of studies of other aspects of VET in recent years. Mulder and Roelofs (2013) carried out a comprehensive review of research articles on VET published in academic journals in 2012. Of the 173 articles they identified, fewer than 10 had practitioners as their primary research focus. Beyond solely academic studies, the European Union (EU) and the Organisation for Economic Co-operation and Development (OECD) have both carried out or commissioned extensive studies of VET (see, inter alia, Cedefop, 2009, 2014a, 2014b; OECD, 2010, 2014). These documents often take the form of comparative analyses based on reports from single countries, and they reinforce the consensus mentioned above that VET has a major contribution to make to economic competitiveness. Their purpose is most often to inform policymakers and other decision makers about how to encourage economic development, with education in general and VET in particular considered as an integral part of broader economic policy. In line with this consideration, the supranational outlook of these studies is underpinned by the concept of human capital (discussed later in the chapter), where an individual worker's increased level of skills leads to improved productivity and so to economic growth. Cedefop (2012) explicitly set out this line of thought:

> European enterprises need:
> - new (highly-) skilled workforce with new knowledge, skills and competences, innovative thinking and capacity entering from education and training systems;
> - existing workforce constantly updating and upgrading their knowledge, skills and competences to adapt to social, technological, and sectoral developments in business. (p. 9)

Perhaps ruefully, the authors of this report add, "So far, this has remained a challenge for most Member States" (p. 9), yet the basic premise of the causal link between enhanced skills and economic growth is unquestioned. Necessarily, these types of report view VET systems from a considerable height, from where the heterogeneity of individuals working in VET and their work settings are indistinguishable. Consequently, these reports seem rather remote from the lived experience of VET practitioners.

Even reports that focus on particular national contexts (see, inter alia, ReferNet France, 2010; Virolainen & Stenström, 2014) often fail to capture the

diversity of VET practitioners and how they work. Some research has been focused on specific vocational institutions and, although much less frequently, individual VET practitioners (see, inter alia, Francisco, 2014; Orr & Simmons, 2011). These different levels of analysis are not, however, easily compared. Kirpal and Wittig (2009) based their study of training practitioners in Europe on 700 responses from 28 European countries. Although their study is insightful, Kirpal and Wittig (2009) are refreshingly candid that their "results can only tentatively indicate certain trends" because their sample is not representative (p. 7). Even VET systems that from a certain distance may appear quite similar, such as those of the Nordic nations, are quite distinct under closer scrutiny because they are the products of particular circumstances and specific histories (Jørgensen, 2014, p. 5). Although there is much to be learned from research with an international scope, we need to recognize what may be lost in the inevitable generalization. That is especially the case when we wish to examine the objective circumstances and subjective responses that directly affect individual VET practitioners and their day-to-day practice. With these caveats in mind, this chapter starts with a broad view of the relationship of vocational teachers and trainers to societies and economies, before narrowing the focus to what we know about the composition of the VET workforce and the contexts in which it can be found. We will start by examining the status of VET in society and how that affects VET staff and their practice.

Working for the Poor Relation

> VET has been oddly neglected and marginalised in policy discussions, often overshadowed by the increasing emphasis on general academic education and the role of schools in preparing students for university education. It has also often been seen as low status by students and the general public. (OECD, 2010, p. 11)

The OECD reached this troubling if unsurprising conclusion about the international position of VET following their survey of systems in 17 countries as diverse as China and the Czech Republic. Significantly, the countries the OECD surveyed included those with traditionally strong publicly funded VET systems, such as Germany and Austria, where even there the bias was toward academic education. In Denmark, for example, often identified as a nation with a strong VET system, VET has "a general low reputation among young people and their parents and a continuously lower number of young people entering VET education immediately after compulsory school" (Andersen, Gottlieb, & Kruse, 2016, p. 3).

Similarly, Harris, Simons, and Clayton (2005, p. 29) noted how the perceived status of VET in Australia had been falling, especially VET as provided in the country's Technical and Further Education (TAFE) colleges. These attitudes have persisted in the UK for over a century (Green, 2013; Unwin, 2009). Billett argues that the low standing of VET stretches back to the Ancient Greek philosophers, first Plato and later Aristotle, whose sneering denigration of practical

occupations are consistent with contemporary prejudices in many societies. Then as now, Billett (2014) notes that "it was largely 'privileged others' that shaped the standing of occupations and stipulated the kinds of educational provisions to access them and who would participate in them" (p. 12).

Arbitrary decisions about what was and was not valued became reified as markers of distinction within societies characterized by inequality. These markers may be tacit because, as Bernstein (2000) has argued, it is "silence which carries the message of power; it is the full stop between one category of discourse and another" (p. 6). In other words, it is the distinctions between categories that are important, so the high status of academic education is comprehensible only in relation to its separateness from vocational education, which has lower status. Those different educational experiences mark social distinction and reproduce social inequality (Bourdieu & Passeron, 1990); the silence to which Bernstein refers is the unspoken of space that separates them. That distinction and the inequality it expresses are also evident in societal attitudes toward VET practitioners. Responding to these attitudes, Cedefop (2014b) have been explicit about the need to raise the status of VET trainers throughout the EU. Similarly, the OECD (2010) reports on the relative status of VET in their member countries and how this can affect the recruitment of teachers and trainers, and that status varies according to specific contexts (Billett, 2009, p. 1175). Sweden's VET system has relatively high status (OECD, 2010, p. 200) and therefore relatively so do VET trainers and teachers. This is common to other nations with strong publicly funded VET systems, such as Germany, the Netherlands, and Austria. Even nations with weak publicly funded VET systems have instances of well-regarded trainers, such as those in England working within high-status apprenticeship programs in companies like Rolls-Royce, Nissan, and British Telecom (Chankseliani, James Relly, & Laczik, 2016). This chapter is, however, most concerned with how lack of status affects VET staff and restricts their agency in three ways that will be considered in turn.

First, in many societies, VET teachers and trainers are themselves less valued by society by comparison to their academic counterparts. To develop the point about the status made above, VET is often positioned as provision for the so-called non-academic "others" in the population rather than for everyone, and can also be "merely associated with conditioning for specialized jobs" (Grollmann, 2008, p. 535). This undervaluing and/or narrowing of VET's purposes extends to the VET workforce itself (Clarke & Winch, 2007, p. 3). Second, a central function often ascribed to education in general and to VET in particular is to address social inequality. VET is often perceived as the venue for remedial education, as the place where disaffected young people can be given a second chance. As a consequence, Coffield et al. (2008) describe how some practitioners in English FE colleges, who are mainly vocational teachers, "have shifted from teaching to welfare" (p. 8). VET teachers who are themselves undervalued in an unequal society can certainly help to transform individuals' lives, but they can have only very marginal influence on chronic social injustice, whatever responsibility they are ascribed (Avis & Orr, 2016, p. 61). Third, in contexts where there are restricted conceptions of VET, practitioners are afforded less control over their teaching and training than their academic

counterparts. As Billett (2013) has argued, the low status of VET teachers and trainers has entailed (in some countries) the micromanagement of their practice. This is associated with a narrow conception of skill and vocational expertise evacuated of theoretical knowledge, which has led to a reductive understanding of what vocational trainees need to learn, often expressed in narrowly defined competences (Clarke, 2007, p. 63). This reductive approach to work-related learning in turn marginalizes the role of VET practitioners. In the specific context of learning in the workplace, Unwin et al. (2007) identified "a dramatic foregrounding of the so-called informal nature of learning" (p. 336), which may also ignore even the context in which learning takes place.

Marginalization of teaching and teachers is redolent of what Biesta (2012, p. 36) has termed the "learnification" of the education system; learning is perceived reductively as a process with a sole emphasis on the individual, whereas education is about a relationship between teachers and students and emphasizes knowledge content. If what VET trainees need to learn is simple, to follow the logic, it can be codified and packaged into units that do not require expert teachers. In England, this process is redolent of what has been called a "truncated model of trust" (Avis, 2003, p. 315) in the professional judgment of vocational teachers. This is characteristic of a trope in policy internationally that the complexity of VET teaching can be prescribed and controlled, which contrasts sharply with the idea of vocational pedagogy (discussed further in this chapter). Similarly, characteristic of that policy trope is how vocational teachers' and trainers' voices are systematically marginalized. From their study of VET in England, Coffield et al. (2008) concluded that "the experience, concerns and innovative ideas of the professionals who run the sector are conspicuously absent" (p. 25). Meanwhile, European policymakers, including those from England, are urged to "be proud" of VET practitioners, in this case their work-based trainers, who "contribute to raising young people's employability" and "to raising productivity and competitiveness of companies" (Cedefop, 2014b, p. 4).

VET Teachers and Trainers and Their Relationship to Economic Demands

Garret Fitzgerald, Prime Minister of Ireland throughout much of the 1980s when its so-called Celtic Tiger economy was roaring, claimed that his country's success resulted from "the long established and … universal conviction that education is key to economic growth" (quoted in Wolf, 2004, p. 316). Only a few years later, Ireland was in deep recession, with all public servants, including vocational teachers and trainers, either losing their jobs or forced to take large pay cuts. The source of Ireland's economic woes was not associated with educational practitioners, vocational or academic, being suddenly less effective or less productive, but with banks making loans to people who could not repay them. However, this hubristic experience has not prevented policymakers from once again rhetorically describing a causal link between enhancing VET and growing the economy based on human capital theory (see Chapter 6, this volume)

The effect of the human capital discourse is to understate structural inequality in society and access to the economy. Individuals are seen as primarily responsible for finding a job or for enhancing their value in the workplace, despite the vagaries of the economic cycle. This is apparent in the injunction to young people to improve their employability, which downplays the impact of the economic crisis and its drastic effect on youth unemployment. More pertinently for this analysis, the discourse of human capital illuminates the relationship between VET practitioners and national and global economies. In its synthesis of research across the EU regarding the 2008 economic crisis, Cedefop (2009) concluded, "VET is becoming increasingly driven both by the labor market and varied learner needs, with an emphasis on providing up-to-date technical skills while developing employability" (p. 111). The "varied learner needs" may include those of disaffected young people, as mentioned in this chapter, but the direction of causation that Cedefop identify here regarding the labor market has a broader significance. European VET systems respond to the economy—the economy does not respond to VET systems. Yet, even though VET systems and by extension VET practitioners are seen as essential to economic growth, as we have seen, teachers and trainers are not trusted to fulfill that role (Grollmann, 2009). As Billett (2009) argues, this is a contradiction for VET as, on one hand, "it is highly valued in achieving national social and economic goals," whereas "on the other hand, it is considered not mature enough to organize its own practice and futures" (p. 1179). VET practitioners may have responsibility, but they do not have control. Such a restriction on VET practitioners' professional autonomy is a further sign of their low status in many countries. Later in this chapter, we examine the extent to which recent interest in vocational pedagogy may provide a welcome correction to this restriction on autonomy.

The VET Workforce

There is surprisingly little statistical information available on VET teachers and trainers at a national or international level relative to schools and universities. From a European perspective, Cedefop (2009) argue, "Poor data availability on VET professionals makes it impossible to provide a comprehensive statistical picture of the VET workforce and of the various challenges it faces" (p. 115). The OECD (2010) has reached the same problematic conclusion, finding that "in many countries data on the VET teacher and trainer workforce are weak" (p. 96). It cites the example of Australia, which collects rich data on many aspects of VET, but still "there is no single source of workforce information" (p. 96). Even in countries that do collect data on VET teachers and trainers, such as Switzerland, those data are limited to variables such as age, gender, and work patterns. Nevertheless, we know that in 2010, 43% of Swiss VET teachers worked part-time, proportionally many more than in other educational sectors (Berger & D'Ascoli, 2012, p. 310). This is similar to English FE colleges, where 60% of teachers are part-time compared with 18% for English secondary schools (Education and Training Foundation [ETF], 2016, p. 25).

This high proportion of part-time staff is common throughout VET systems, especially as practicing professionals from the occupational workplace may work part-time as teachers or trainers of that occupation. In Australia, Smith (2009) estimated that there were around 40,000 full-time VET teachers in vocational TAFE colleges and a further 300,000 involved in VET teaching and training more broadly. Smith (2009) also identified a characteristic common to very many systems, which is that VET teachers and trainers comprise an aging workforce. The Swiss data show that, in 2010, 39% of VET teachers were older than 50 (Berger & D'Ascoli, 2012, p. 318), similar to the figure for vocational teachers and trainers in upper secondary schools in Sweden (OECD, 2010, p. 92). Although this age profile distinguishes VET practitioners from staff in other educational sectors, VET practitioners' age and the associated extent of their experience highlight how their role may be differently perceived. For example, older practitioners may not be as current with new technology or work processes as younger colleagues, but their longer experience may lend them credibility with students or workers. Similarly, older practitioners may be more able to impart tacit elements such as occupational history and workplace mores, which may help younger students and workers to recognize and develop a professional identity. Nevertheless, Hoffman (2011) has identified how even countries with strong VET systems, as well as the USA, "face the looming retirement of many [VET] teachers" (p. 124) who will need replacing. This sense of an aging VET workforce being problematic may, however, be a misperception because the age profile in VET systems all over the world largely reflects how people become VET teachers or trainers after a previous career. VET practitioners are, therefore, necessarily older than teachers in other sectors. Indeed, former occupational experience may be a statutory requirement. Switzerland is typical of nations with apprentice-based dual system VET arrangements, because it requires VET teachers to have had at least several years of prior professional experience.

An older workforce may be a shared characteristic of VET systems, but there are many more differences between them. Whereas in Switzerland, 35% of VET teachers are female compared with 81% in primary schools (Berger & D'Ascoli, 2012, p. 318), in England's colleges the proportion of female teachers in 2014–2015 was 58% compared with 74% in schools (ETF, 2016, p. 25). This difference between the balance of gender in the Swiss and English sectors is another indication of the relationship between the economy and VET and, as discussed in this chapter, of the direction of movement within that relationship. In Switzerland, the VET system trains significant numbers of students and apprentices in still mainly male technical and industrial occupations, whereas in England the balance in the economy has shifted due to the rise of the service sector. Provision in English FE colleges has reproduced aspects of this economic transformation with many more courses for childcare, hairdressing, beauty therapy, and tourism, although all of these have for decades been important components of FE provision. Many of these occupations have predominantly female workforces, which is necessarily reflected in the profile of vocational teachers recruited from those occupations. The feminization of FE may also be a reflection of its lower status;

that is, in an unequal society, it is less attractive to men who may have more access to better jobs elsewhere than women have (Simmons, 2008).

Significantly, it is the economy that shapes the VET system and workforce; it is not the VET system and workforce that shape the economy. Research on early-career vocational teachers in England found that some of them had experienced periods of unemployment after they commenced teaching in the aftermath of the 2008 economic crisis and cuts in the funding of VET (Orr, 2012b). This included people who had been recruited to teach subjects where there had only recently been a shortage of teachers in FE colleges.

The decision to become a teacher or trainer after occupational experience is varied. Berger and D'Ascoli (2012, p. 319) categorized the reasons as a "push" from the previous occupation and a "pull" from the new one. The push might be the deterioration of work conditions in the previous occupation or the long-term effect of physical work, whereas the pull might be that teaching was perceived as more pleasant than, for example, working on building sites or heavy industry. In their statistical analysis of the motivation to become a VET teacher in Switzerland, Hof and Strupler Leiser (2014) found that those who went on to become VET teachers had earned more in their former occupations than equivalent colleagues who did not go on to become teachers. This suggests that a financial incentive for career change is weak and that other nonmonetary factors such as flexible working may be more important. Orr (2012a) cites the example of a VET teacher at a college in England who explicitly sought the higher social status of describing himself at his rugby club as a teacher rather than as a joiner. Given the variety of routes into and through VET teaching, Harris, Simons, and Clayton (2005, p. 28) adopt "the notion of 'opportunities'" to explain how VET practitioners in Australia move through the stages of their working life in a way that can seem almost accidental according to what is available at any point of time. This sense of opportunities taken is more accurate than VET practitioners having "defined career pathways," as many of the participants in the study had never anticipated becoming VET teachers. Similarly, Gleeson et al. (2005, p. 449) found that for FE teachers in England, it was "less a career choice or pathway than an opportunity at a particular moment in time" (see also James and Gleeson, 2007).

If more agreeable working conditions may attract people to become VET practitioners, one factor that the OECD (2010) recognized explicitly that inhibits recruitment of vocational teachers internationally is the unfavorable discrepancy in salary with their former occupation. With Switzerland as one notable exception (Hof & Strupler Leiser, 2014), vocational colleges in many countries are unable to offer salaries commensurate with those available elsewhere in industry for skilled workers. Nonetheless, the OECD (2010) also recognized that the global recession had made working for colleges or other VET providers more attractive as private sector jobs had become less secure. Perhaps from the perspective of "never letting a good recession go to waste," the OECD has argued that VET systems around the world should be ready to take this chance to employ occupationally experienced teachers (OECD, 2010, pp. 92–93). Whatever the specific push or pull factors associated with an individual's decision to become a VET teacher or trainer, this different role includes aspects of

the former occupation as well as new practices and skills. This emergent practice and professional identity of the VET trainer or teacher are what we examine in the following sections of this chapter.

Training and Professionalism

The authentic voice of VET teachers and trainers is unfortunately only rarely found in research on VET, but the expertise and sense of occupational belonging of the individual practitioner affect their professional development and practice. This account, from a new carpentry teacher's course assignment on an in-service teacher education course at a TAFE college in Australia, is revealing of the rapid transition from "tools to teaching" that characterizes the initiation of VET teachers in many countries.

> Twenty six months ago I was happy and content plodding along on the building site…. Shorts, boots and a blue singlet were my uniform and my language was not quite as cultured or as socially acceptable as it is now. I had never been in front of a class until February when I started as a casual teacher at [a vocational college]. I consider myself fortunate. I love my trade and I love helping people to learn. My personal philosophy of teaching VET is to attempt to provide the best possible opportunity for my students to learn the skills and ethics of carpentry. Carpentry is a very traditional trade and many of the basic construction principles have been around for centuries. As a custodian of the trade I feel morally bound to maintain high standards of both workmanship and attitudes, and instill these in my learners through effective training and teaching. We should strive to make the experience an enjoyable and enriching one for our learners. (Kemmis & Green, 2013, p. 105)

This teacher's commitment to and affection for his trade are apparent in other VET teachers' accounts of their former craft or occupation (Orr, 2012a). Many of the respondents to Berger and D'Ascoli's (2012, p. 319) survey of vocational teachers in Switzerland saw teaching as a way to share their knowledge and interest in their vocational subject and also expressed a commitment to teaching. The relationship between these two aspects of the VET teacher's role, subject knowledge and teaching expertise, has been referred to as *dual professionalism*. As Wheelahan and Moodie (2011) put it, "being an industry expert is necessary but not sufficient for being a VET teacher or trainer. They must also be expert teachers and trainers" (p. 24). As "dual professionals," VET teachers and trainers need to keep up-to-date with their occupational field and be effective pedagogues (see, e.g., in a Swedish context, Andersson & Köpsén, 2015). This plausible conceptualization of the complexity of the VET practitioner's role can, however, become another appeal for VET teachers and trainers to do more and be better, despite circumstances that may restrict their professional development as teachers or occupational experts. In their study of vocational teachers in secondary

schools in Australia, Dalton and Smith (2004) observed that vocational teachers tended to consider themselves too busy to update their skills and knowledge unless in-service training is integral to their work and negotiated within their workload. This was echoed in Harris, Simons, and Clayton's (2005) study of Australian VET practitioners in general:

> Practitioners perceived that drivers for change were largely attributable to influences outside their place of employment. They named government policy as having the most marked effect, influencing curriculum practices and the way training is provided. The second major driver was the expectations of industry and the community, and the third was economics/finances. (p. 8)

The internal drivers identified by practitioners included expectations to be "responsive," the pressure for greater accountability, and the pressure to be innovative in their teaching and learning and to promote access to learning opportunities within a context of changing workloads and student characteristics. These factors can be influenced as much by national policy as by VET institutions. VET teachers and trainers are expected to cope with "constant change" (Billett, 2009, p. 1176), which is so often represented by the proliferation of paperwork (Harris et al., 2005). Coffield et al. (2008) have argued that it has been a deliberate policy, rather than oversight, by policymakers around the world to concede very little control to VET teachers and trainers over their practice.

The "constant change" that Billett (2009) identified as being prevalent in some VET systems and that impinges on the development of teachers' practice is especially important in the context of calls made internationally for the professionalization of VET staff (Grollmann, 2009, p. 1197). Katz (1969) has argued, in relation to nurses, "Few professionals talk as much about being professional as those whose professional stature is in doubt" (p. 71), and much the same could be said of VET teachers and trainers, who have been similarly called a "semi-profession" (Grollmann, 2008, 2009). This term indicates how VET practitioners may require a specific body of sophisticated professional knowledge, both occupational and pedagogic, but that they do not have the status of the established professional groups such as lawyers and architects. Nor do they have the autonomy of those established professionals, and so the codification and close control of practice, as described here, have been persistent features of these calls for professionalization. This may once again expose the lack of trust in VET teachers and trainers in many jurisdictions. Another common feature is the development of national professional standards. Hoffman (2011) cites the US National Board for Professional Teaching Standards (1997) for school-based VET teachers in the USA, who should:

> command a core body of knowledge about the world of work in general and the skills and processes that cut across industries, industry-specific knowledge, and a base of general academic knowledge. They draw on this knowledge to establish curricular goals, design instruction, facilitate student learning, and assess student progress. (p. 126)

There is not the space here to explore the various standards for VET staff or the definitions for professionalism with which they are associated except to note that, like the example from the USA, they describe an ideal that is necessarily abstracted from the vicissitudes of context. Tummons (2014) found that even significant changes in the official standards for VET teachers in England had virtually no impact on the content of the most popular teacher education course books in the sector. It is reasonable to assume, therefore, that the content of initial teacher education courses for VET teachers was also little affected by the new standards, so they are unlikely to determine how new VET teachers practice.

A much more potentially useful debate in relation to the professional practice of vocational trainers and teachers focuses on vocational pedagogy. The concept of vocational pedagogy suggests that the successful teaching of particular vocational topics demands at least careful consideration as to approach and activities, and, furthermore, the successful teaching of particular vocational areas may involve specific or signature approaches and activities. UNESCO hosted a virtual conference on vocational pedagogy in 2014 with the subtitle "What It Is, Why It Matters, and How to Put It into Practice," which involved participants from 65 countries (Lucas, 2014, p. 15). Although *vocational pedagogy* will differ by situation, the term itself entails teachers and trainers making decisions in relation to particular students or trainees and in relation to the specific knowledge or skill they wish them to develop (Guile, Kersh, & Tiris, 2016; Lindberg, 2003). This implies that vocational teachers and trainers have individual agency and, furthermore, that they need to be well-informed in order to make good pedagogical decisions. Thus, it enacts a very different conception of professionalism from one that involves micromanagement or even one that involves vague if worthy statements that comprise professional standards.

Teacher Education for VET

Misra (2011) and Grollmann (2009) distinguish types or traditions of VET teacher education that vary in their balance between general pedagogy and subject specialism and how the relationship between the two is conceived. These types and traditions can coexist in the same country. Although the content and management of initial teacher education matter in their own right because they may inform practice or set expectations for new teachers and trainers, this section will concentrate primarily on what that initial education tells us about the position of VET staff. Kirpal and Wittig (2009) found that 74.8% of their respondents from around Europe had a qualification as a teacher or trainer, commonly achieved in-service while already in a teaching or training role. This means that the vocational institution is itself a site of work-based learning for the new vocational teacher on an in-service course, although one where there may be little difference between the expectations placed on the trainee and those placed on the fully fledged practitioner. Both may be expected to perform as fully experienced teachers or trainers. Orr and Simmons (2011) found that this weak

distinction between novice and qualified teacher was associated in some colleges in England with, using Fuller and Unwin's (2004) concept, a restrictive learning environment that inhibited experimentation in teaching approaches or activities by making the perceived failure of any innovation appear too risky. In some circumstances, this led to a limited conception of teaching practice that was characterized by a didactic teacher-centered approach because new teachers were learning to cope in a challenging context rather than learning to teach with flair. Much of the new teachers' opportunity to develop depended on the specific circumstances of their department or who their manager was (Lucas & Unwin, 2009). Holding a teaching qualification is, nevertheless, often associated with positive effects on VET teaching. In Germany, the compulsory training of workplace trainers involved with apprenticeships was suspended for 5 years because of pressure from employers that were unwilling to fund it. Subsequent evaluations of this period of hiatus suggest that companies without qualified staff had more complaints about the performance of the apprentices, who were also more likely to drop out of their own training (Hoffman, 2011, p. 130). In Denmark, Andersen et al. (2016) found that the pedagogical competences of VET teachers had risen considerably since the introduction in 2010 of a requirement to achieve a high-level teaching qualification within 4 years of being employed as a teacher.

The content of courses for teachers and trainers differs between and within countries, mirroring the fragmentation of international VET systems. Resonating with the previous discussion of vocational pedagogy, those differences typically center on the proportion of subject-specific or occupationally specific training around pedagogy against pedagogical training that is more generic. Cedefop (2009) have recognized the increasingly academic nature of VET teachers in some European countries, which is reflected in the emphasis of their initial teacher education courses, such as in Denmark. To be respected, it would appear, VET teacher education courses have to mimic academic counterparts. The situation for VET teacher preparation in the USA is described differently by Hoffman (2011), who expresses doubt about whether VET teacher training is preparing them for their evolving role, which, she argues, is *less* occupation-specific and *more* holistic. Smith (2009), among others, has highlighted controversy over competence-based teacher education qualifications for VET practitioners in Australia, which have been perceived as both reductive and restrictive. She also raises the issue of who pays for these courses: employer, employee, or the state. Hence, pedagogic formation is another site of dispute over the role and position of VET teachers and trainers. The debate over professionalism often removes VET teachers and trainers from the circumstances that most directly shape their professional practice, which is the place where they work. Grollmann (2008) expresses a similar concern:

> Policies developed to cultivate and underpin the professionalization of vocational teachers are often associated with high-level structural considerations, which are seen in particular public indicators such as the level of teacher education or payment. This view is in danger of overlooking the importance of the concrete working conditions of teachers in [VET] institutions and the specific demands in vocational education. (p. 545)

Addressing these concerns, the "Context and Former Role" section examines the effects of working conditions, but starts with the enduring influence of the teacher's or trainer's former occupation.

Context and Former Role

Viskovic and Robson (2001) argued, "Most vocational teachers do not become fully participating members of a wider teaching community," as they never drop their former occupational identity (p. 234). This conclusion is overstated, and other studies have found inconsistency in how even the same vocational teachers described themselves at different times. Teachers in Orr's (2012b) study, which is still collecting data, have described themselves as teacher, as trainer, or as their former occupational role at various points over the duration of the research. This was partly dependent on their role at any point of time (and their roles have constantly changed), although the respondent who had trained as a teacher on a full-time course prior to joining the profession was most likely to call himself a teacher. Kemmis and Green (2013) illuminated the relationship between former occupation and teaching role by employing the concept of "practice architectures" in their study of VET teachers at two institutions in Australia. Citing Kemmis, Edwards-Groves, and Heikinnen (2012), Kemmis and Green (2013) define *practice architectures* as

> a coherent and complex form of socially established cooperative human activity in which characteristic arrangements of actions and activities (doings) are comprehensible in terms of arrangements of relevant ideas in characteristic discourses (sayings), and when the people and objects involved are distributed in characteristic arrangements of relationships (relatings), and when this complex of sayings, doings and relatings 'hangs together' in a distinctive project. (p. 101)

Their nuanced analysis finds that VET teachers differ from other teachers because "the sayings, doings and relatings that occur as interrelated elements of the practices of vocational teachers in educational settings are linked with the sayings, doings and relatings of the workplaces they experienced in their previous occupations as practitioners of particular vocations" (p. 101; see also Chapter 22, this volume).

The irreverent banter often found, for example, on construction sites or in professional kitchens will, therefore, be transported into the teacher or trainer's staffroom (Page, 2015).

Orr's research (Orr, 2013) provided an illustration from a college fashion department in England as to how occupational identity is central to VET practice:

> The staff, who were all female, and students, who were mainly female, talked enthusiastically about texture, colour and fit and the staff would illustrate techniques by showing garments that they had themselves made.

> Many of the staff had worked at the college for a long time and had even been students in the same department. They did not have a shared sartorial look, but several wore subtly unusual clothes…. Here was more than just a group of people sharing a workspace. (p. 383)

Despite distinctive and sustained cultures within occupational fields, Orr (2013) found that the attitudes and practices of teachers were also shared between other, quite distinct occupational cultures in the same college. Those attitudes and practices were most likely to be affected by influences from beyond the college and their former occupation, such as national policy or preconceptions of a teacher's role that are widely held in general society. Studies that focus solely on the effect of local contexts may underestimate the effect of wider cultural influences on vocational teachers in colleges. Such wider influences include both how their previous occupations are associated with weak social status and that the agency of vocational teachers and trainers may be tightly circumscribed and centrally directed by national directives.

Conclusion

As this chapter has discussed, where VET teachers and trainers are mentioned in policy documents at all, it is often to state their importance in the most fulsome terms. The OECD (2010), for example, state that "the quality of the teaching and training profession is critical to effective learning in vocational programmes" (p. 91). In a similar tone, Cedefop (2009), who claim that "teachers, trainers, and other VET professionals are the ground agents of change" for a modernized European VET system (p. 111), have published a list of exhortations, including:

- Trainers are lifelong learners: recognise their identity and work; support their lifelong learning;
- Supporting trainers in companies is a shared responsibility: ensure effective cooperation and coordination;
- Competent trainers in companies matter: make them part of a broader agenda and use all available funds and programmes. (Cedefop, 2014b, p. 2)

The apparent need for these statements may well reveal a flaw in the demand-led model for the development of workforce skills, as not all employers are willing or able to engage in that development. More pertinent to this discussion, these effusive statements are belied by the implementation of policies that tend to focus on systems and procedures in which VET practitioners are only one part. All too often, VET practitioners are not to be trusted to perform as autonomous professionals and are subject to close control as a direct result of policy initiatives. This is a consequence of the position of VET practitioners, which is contradictory. On the one hand, their capacity to grow the economy or enhance social mobility is overstated in policy. On the other hand, they experience condescension that derives from their weak social status. That contradictory position of VET practitioners also reflects the economic cycle, just as it reflects social inequality. VET suffers in many countries from being the second-choice educational pathway and

certainly not one for the elite who run those countries. Indeed, this elite may know little about VET, except that in some vague sense it is necessary, because neither they nor their children have experienced it. This absence of knowledge "provides an epistemological veil" (Apple, 2014, p. viii) behind which policy can be formulated with little attention to the opinions of those who will be subject to it, including VET teachers and trainers. That same "epistemological veil" also conceals the effects of the global recession on workforces as well as the effects of persistent structural inequality. Nonetheless, VET teachers and trainers can and do play a crucial role for many trainees who go on to find opportunities previously hidden to them of a better job or even a different life. To return to where we started, although some expectations of VET staff may be unreasonable, VET teachers and trainers are certainly vital to successful outcomes for VET systems at any level. One source of cautious optimism for the position of VET staff that was identified in this chapter is the rising interest in vocational pedagogy. This is predicated on VET practitioners with expertise in their subject and expertise in how best to teach it, making informed decisions about their practice. The shift in perception that this entails would properly recognize what teachers and trainers can contribute to VET systems as autonomous professionals, and in so doing it might just benefit society as well.

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Part IV

VET as a Developing Practice

18

The Learning Potential of Boundary Crossing in the Vocational Curriculum

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Discrepancies, Transfer, and Boundary Crossing

Vocational education and training (VET) is a heterogeneous field, which is organized in diverse ways in different countries. Part of VET is school-based: Students are at school most of the time and do an internship at the end of their vocational education. Part of VET is work-based: Employees work most of the time, but receive training to qualify better for their current or future work. Both school-based education and work-based training have been studied a lot, but far less is known about the transitions that students and employees make between school and work. Yet these transitions are crucial. If learners cannot connect what they learn in different settings, it is very likely that what they have learned in educational settings remains inert. What they have learned in an internship or regular work may not be enriched by what they gained in education or training. It is therefore crucial to think through what implications follow for curriculum and pedagogy in VET when we ask how to support VET learners to make such transitions and connections. Such transitions and making connections have been conceptualized in terms of *boundary crossing*.

The purpose of this chapter is to formulate a theoretical framework for boundary crossing between school and work (and back). We do so with an eye on improving curricula for both school- and work-based VET, or combinations of school- and work-based learning (see also Zitter, Hoeve, & de Bruijn, 2016; and Chapter 21, this volume). In the most general sense, a curriculum is a course, track, or plan for learning (Taba & Spalding, 1962; Van den Akker, 2010). What is typical of any vocational curriculum, as compared to one for general education, is the boundary crossing between school and work practices. Most VET curricula include work placements, internships, or apprenticeships,

periods when learners take part in workplace practices, so learners make many transitions (Aarkrog, 2005; Billett, 2007, 2010, 2014; Guile, 2006; Tuomi-Gröhn & Engeström, 2003).

Apart from the curriculum as a plan for learning, there is also the implemented and the experienced curriculum (Goodlad, 1979). Thinking about how to effectively organize vocational education also involves, therefore, understanding and questioning how transitions between school and work take place. These transitions have been conceptualized in different ways, but have most dominantly departed from a comparative approach, with a focus on discrepancies and transfer between school and work. We briefly discuss the limitations of such a comparative approach, and we describe a boundary-crossing perspective as a fruitful alternative to understanding challenges and opportunities for learning in a vocational curriculum.

Within comparative approaches, a commonly used term is that of *discrepancies*. Many reports point to discrepancies that VET offers and employers need (Detmar & De Vries, 2009; Finch, Mulder, Attwell, Rauner, & Streumer, 2007; Stern & Wagner, 1999). Such discrepancies can be quantitative (e.g., "There are not enough employees with the right qualifications") and qualitative (e.g., "Starting employees are not skilled enough or have not learned the right things"). Although the knowledge generated in such studies is useful for policymakers, it provides little insight into the learning processes of students as potentially taking place across contexts. Yet such insight is necessary to support students in integrating what they have learned in different school- and work-based contexts (Billett, 2014).

There are many studies on transitions between different settings. As observed by Jackson (2011), these transitions are often framed in terms of *transfer*, focusing on the extent to which what has been learned at school is applied at work. The underlying assumption of transfer is that knowledge constructed in one site is carried to a new site in a generalized form. Although the metaphor of transfer points to an important phenomenon and has survived many paradigms of learning theory (Säljö, 2003), its limitations have become clear. First, knowledge and skill are not just any individual's possession or commodity. They have been shown to be distributed across humans, routines, and machines (Hutchins, 1995). Second, empirical evidence shows that problem solving at work or in daily life is unlike performing well-defined tasks (Lave, 1988). Rather, continuous processes of contextualizing and recontextualization take place (Guile, 2012; van der Sanden & Teurlings, 2003; van Oers, 1998). Third, learning is not just an individual endeavor but also a social one (Akkerman et al., 2007; Hodkinson, Biesta, & James, 2008). A task-oriented notion of transfer of knowledge by individuals (e.g., Ellis, 1965) is therefore too limited for understanding learning.

The aforementioned limitations of the transfer metaphor are even more salient in VET because students and interns typically move back and forth between school and work settings (Tanggaard, 2007). Wals, Lans, and Kupper (2012) make a plea for a "more interactive and less 'fixed' model" (p. 19). An increasingly large group of VET researchers now prefers to conceptualize school–work transitions in terms of boundary crossing (Konkola, Tuomi-Gröhn, Lambert, & Ludvigsen, 2007; Tuomi-Gröhn and Engeström 2003). In line with sociocultural

and cultural-historical traditions, the boundary-crossing approach takes broad units of analysis so as to include practices or activity systems (Engeström, 2001). An advantage of this is the attention on the back-and-forth movement between contexts while keeping collective learning processes in view. This advantage makes boundary crossing an interesting concept to theorize further and study empirically within the VET domain.

The literature on boundary crossing not only offers a broader perspective on learning than the transfer literature. It typically also values differences between contexts differently. The transfer literature mostly conceptualizes the differences between practices as something problematic, but the literature on boundaries takes these to have learning potential (Engeström, 2001). At the boundaries between practices, Wenger (2000) argues that people are invited to broaden their views:

> There is something disquieting, humbling at times, yet exciting and attractive about such close encounters with the unknown, with the mystery of 'otherness': a chance to explore the edge of your competence, learn something entirely new, revisit your little truths, and perhaps expand your horizon. (p. 233)

What these processes look like in VET deserves more attention. In this chapter, we will therefore first elaborate specifically on the various ways in which learning across contexts can take place, drawing on our previous study of existing research on boundary crossing (Akkerman & Bakker, 2011) as well as on empirical studies in VET carried out by ourselves and others. We conclude with presenting a heuristic that we call *boundary analysis* to stakeholders in VET that may assist them in improving VET curricula.

Boundary Crossing: A Theoretical Framework

A key reason for us to carry out a review of research on boundary crossing was the lack of precision in the debates on this phenomenon. To define the concept, we first discuss the term *boundary*. Like *transfer, boundary* is a metaphor (Säljö, 2003). Rather than in physical boundaries between terrains or buildings, educational theory is interested in social and cultural boundaries. Just like physical boundaries, sociocultural ones are often needed. For example, school programs have entrance regulations, and some vocations are protected by national laws (i.e., not everyone can call themselves a nurse). At the same time, boundaries are experienced as undesirable. Poor collaboration or communication between practices can cause students, interns, supervisors, and teachers to be frustrated (Akkerman & Bakker, 2012a; Harreveld & Singh, 2009; Konkola et al., 2007; Poortman, 2007; Reenalda, 2011; Tanggaard, 2007; Vähäsantanen, Saarinen, & Eteläpelto, 2009; Wesselink, de Jong, & Biemans, 2010; Zitter, 2010). On the basis of the phenomena studied in the literature, we have defined *boundaries* as "sociocultural differences that lead to discontinuity in action or interaction" (Akkerman & Bakker, 2011, p. 139).

The term *discontinuity* is used when actions or interactions do not show the desired progress or when they require substantial effort; for example, people encounter a problem caused by a difference between practices, or organizations do not succeed in making innovation happen. More concretely, interns (at least in the Netherlands, where our research has been based) often have their competencies assessed with assessment forms designed at school. We use the term *intern* here for students in VET who are in work placements; they are primarily learners but often with a small salary. Work supervisors often complain that these forms are too general for proper assessment, and they may even shift to using their own, more specific forms (Mekes, 2012). The difference at stake here is that school institutions tend to prefer standardized forms that can be used across different programs and variants, whereas work supervisors are concerned with competencies specific to a particular vocation. Such difference can be called a *boundary* as soon as assessment (an action) or communication (an interaction) is hindered. Communication about assessment can lead to school and work supervisors learning about each other's perspectives. Another example would be interns not recognizing what they have learned at school in the workplace.

We define *boundary crossing* as the efforts to establish or restore continuity in action or interaction across different practices (Bakker & Akkerman, 2014, p. 225). Research has shown how such efforts can be found at different levels: at the individual level (e.g., a student trying to connect two or more different parallel participations, such as a school program and a workplace), at the group level (e.g., a teacher team collaborating with workplace supervisors), or at the institutional level (e.g., school institutions creating partnerships with organizations to facilitate dual trajectories for students) (Akkerman & Bruining, 2016; Bronkhorst & Akkerman, 2016).

Apart from these concepts of boundaries and boundary crossing, we need to summarize some concepts that have already been defined by others. At the individual level of boundary crossing, people typically participate in different practices and bring elements of one into the other. People in those positions have been referred to as *brokers* (Wenger, 1998), *boundary crossers*, or *boundary workers* (Kilpatrick, Cheers, Gilles, & Taylor, 2009). It is often emphasized how valuable such people are because they are the ones who can switch and connect, and thus mediate collaboration and attunement between different practices or activity systems. Within VET, an example of a broker is an entrepreneur who also teaches within a VET program. They can share recent experiences and insights from practice with students and colleagues, and they can help students negotiate an internship. At the same time, this entrepreneur can benefit from what colleagues can tell them that they would not easily encounter when focusing on work only.

Boundary crossers or brokers do not have an easy position. They typically move across terrains where they may not be fully qualified (Suchman, 1994, p. 25), and they "face the challenge of negotiating and combining ingredients from different contexts to achieve hybrid situations" (Engeström, Engeström, & Karkkainen, 1995, p. 319). It is these challenges, however, that simultaneously point to the learning potential of boundary crossing. Several authors emphasize that the role of broker requires particular competencies and personal traits

(Fortuin & Bush, 2010; Walker & Nocon, 2007). Brokers are subject to rules and responsibilities from different practices that may be at odds. An intern, for example, is both a student and an employee, and thus has to meet expectations from both school and work settings ("and/and"). At the same time, many interns do not consider themselves regular students or fully fledged employees ("neither/nor"). From our review study, it transpires that this ambiguity is characteristic for boundary crossers.

Apart from people, objects can also assist in dealing with boundaries. The concept of the boundary object has long been used for artifacts with a bridging function between various practices (Star & Griesemer, 1989). *Boundary objects* are defined as follows:

> Objects which both inhabit several intersecting worlds and satisfy the informational requirements of each of them. Boundary objects are objects which are both plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites. They are weakly structured in common use, and become strongly structured in individual site use. (Star & Griesemer, 1989, p. 393)

A well-known example of a boundary object in VET is the portfolio (Jahreie & Ludvigsen, 2007) that is discussed with not just the school but also the work supervisor. Competence profiles and qualification files can also function as boundary objects that facilitate the collaboration between several school- and work-based practices. Qualification files in the Dutch senior vocational education system summarize the key tasks of over 230 occupations and over 600 variants with formulations of the required competencies. In the Dutch context, Kanters (2008, p. 19) concludes that many users consider the qualification files to provide useful directions and simultaneously offer enough space for innovation, regional differences, and their own creativity. A good balance has been found. However, some users had a different experience. For them, these files leave too much open for local interpretation. They do not offer enough direction to what has to be taught. Such users consider the qualification files to be empty and too generic. For example, in many files, the only phrase related to the mathematics required for the particular occupation is *basic knowledge of mathematics*, even though there are big differences between what counts as relevant mathematics in different occupations (Bakker, Groenveld, Wijers, Akkerman, & Gravemeijer, 2014).

Star and Griesemer (1989) argue that boundary objects have to be flexible in use and yet robust enough to keep their own identity across different practices. When too general (*empty*, in our terminology), they do not provide enough direction. When too specific (or *full*), they are not useful in different practices anymore. Designers of qualification files and competence profiles therefore strive for a balance (Bakker, Kent, Hoyles, & Noss, 2011). In this vein, Kynigos and Kalogeria (2012) argue for "half-baked products" that have to be adjusted locally to the specificities of any situation. An important question for VET is how to design such boundary objects. Cumulative experience and research indicate

the importance of iterative processes of collaboration between different partners (Hoyles, Noss, Kent, & Bakker, 2010; Star & Griesemer, 1989). Wenger (1998) emphasizes that not only features of the boundary objects themselves matter, but also the ways in which different stakeholders communicate with and about these objects, which "are in fact the nexus of perspectives, and that it is often in the meeting of these perspectives that artifacts obtain their meanings" (p. 108).

Learning Mechanisms at Stake in Boundary Crossing

Using the concepts addressed in the previous section, we now raise the question of how learning is evoked in cases of boundary crossing. In line with the literature on boundary crossing, we conceptualize learning broadly so as to include cognitive, social, and identity development, as well as professional development and organizational learning. The review of research revealed four main learning mechanisms that captured the different ways in which boundary crossing can set into motion processes of learning. We refer to these as *identification, coordination, reflection* (perspective making and taking), and *transformation*. These four mechanisms concern explanatory processes (see Maxwell, 2004), in our case of the different ways in which learning can be set in motion when people cross boundaries. We now elaborate on each learning mechanism, with examples from the literature and our own data.

Identification

Several studies of boundary crossing describe learning in terms of identification. In these cases, the identity of one or more practices is at stake, and renewed insight emerges about how these practices or roles are different or complementary. Such insight does not necessarily imply overcoming discontinuities. Typical processes that are part of identification are *othering* and *legitimate coexistence.* An example is provided by Timmons and Tanner (2004), who describe how theater nurses felt threatened by a new but somewhat similar profession called "operating department practitioners." By reconstructing their own professional identity in terms of how these practitioners were different (i.e., *othering*), they found a way to legitimatize their own profession as complementary to the other (*legitimate coexistence*).

In VET, identification processes can also be deliberately stimulated. Zitter (2010) introduced a hybrid module for students in medicine, physiotherapy, nursing, and speech therapy. In this module, students had to identify their own professional tasks before they could do any subsequent tasks. Another example is culinary education, where identification is stimulated by means of clothes, as in the height of the chef's hat, the color of the tie, and so on. When students change role in the team, they also change clothes, which supports their learning about different roles and tasks in the kitchen. In this way, they learn how the various practices are different and legitimately coexist.

In our own research on release days (one day back at school in every 2 weeks of an internship), students appreciated presentations by other students to get a

better image of the different companies offering the internships (Akkerman & Bakker, 2012a). They showed increasing awareness of their own preferences and growing identity as chemical laboratory technicians. Some preferred the "soft" (organic) chemistry at the service of health issues, whereas others felt attracted to the "hard" (inorganic) chemistry required to produce industrial objects. This helped them choose between particular internships.

A different example of identification was observed in the so-called Water Factory (Waterfabriek), a hybrid learning environment in which school-based and work-based elements of the vocational curriculum were combined (Zitter & Hoeve, 2012). The door between this Water Factory and the vocational school was locked on purpose. Students had to make a detour to enter the factory. The idea was that this would demarcate the necessary shift in their attitude and activity (Aalsma, 2011). The boundary crossing thus involved an effort of switching: Here in the factory, wearing special clothes, I have to behave differently. Interestingly, this shift seems to be supported by creating a physical boundary. Supervisors expected that an open door would make it far too easy to enter the factory without changing attitude. Furthermore, supervisors had discovered that a clear distinction between the supervisor of learning and the supervisor of working was essential (Aalsma, 2011). Switching roles proved hard for both students and supervisors themselves. Hence, maintaining the boundary between roles and making these explicit were necessary to foster student learning.

More generally, identification processes are often needed to demarcate each party's responsibilities in the course of learning promoted in students, interns, or apprentices. When this leads to effective collaboration, one could speak of coordination.

Coordination

Coordination in situations of boundary crossing is about developing or using objects or procedures to create or maintain effective collaboration across different practices. Coordination processes typically occur when different practices aim to work more efficiently with minimal interaction and attunement. Within VET, the aforementioned boundary objects, such as competence profiles, assessment forms, portfolios, and qualification files, can have different functions in different practices. Information and communication technology (ICT) is increasingly used for such purposes because of its accessibility from different sites. What makes open-source software attractive is that students can learn from each other and the wider world in which this software is used, with online communities, FAQs, and other tools as support systems. In this way, students learn to coordinate resources from multiple practices.

In the aforementioned Water Factory, students have designed a planning board to coordinate the various phases of the production process between different teams: marketing, sales, production, and plant management (Aalsma, 2011). This whiteboard functions as a boundary object because it fulfills the informational needs of students from different teams in different ways. Other examples of boundary objects are standard operating procedures (SOPs) that are commonly used in companies and hospitals (Akkerman & Bakker, 2012a). Mobile

phones also offer ample opportunities for coordination because many students and employees have them with them wherever they go. At work, this provides interns access to school-based resources. Moreover, interns can take pictures of interesting work situations back to school (Gurtner, Cattaneo, Motta, & Mauroux, 2011). In a study of medical training, Akkerman and Filius (2011) observed medical students looking up information on their smartphones during their internships. Most of the students searched for guidelines, protocols, and "rules of thumb" at least once a week. Patient records and reference books were even consulted on a daily basis. About half of the students made personal notes, and all students made "to-do" lists on their phones and made notes of questions by colleagues or patients.

These examples illustrate the importance of mediating artifacts in distributed work across different practices. Interactive dialogue is only necessary to keep the work flowing. Continuity is established or restored, and hence we can speak of boundary crossing as promoted through coordination.

Perspective Making and Taking (Mutual Reflection)

A third mechanism can be called *perspective making* and *taking*, or *mutual reflection*. This mechanism goes a step further than identification in that people or groups become aware of their own perspectives by defining and formulating them in relation to the perspectives of others (*perspective making*), as well as learn to appreciate and even look through the eyes of others to their own practices (*perspective taking*). Such processes can lead to mutual meaning making and integration of perspectives or types of knowledge. Within VET, we can think of teacher internships that some vocational schools offer to teachers to have them reflect on their teaching through the eyes of the occupation or profession for which they prepare their students (Glaudé, Verbeek, & Felix, 2010). Self-assessment can promote students to take a teacher perspective on their own performance.

Joint meetings with supervisors and teachers of both work and school sites can lead to perspective making and taking. Experiences can be shared on how particular procedures function in practice, how new assessment forms are appreciated, and which further changes in the curriculum may be necessary. When participants of such meetings share their own perspectives and start to incorporate the other's perspective in their thinking, observers see signs of perspective taking and making.

From the research reported in Akkerman and Bakker (2012a), we give an example of an intern who learned by taking a new perspective. This intern had learned a formula for the reproducibility of a measuring method in laboratories. In ideal cases, a measuring method leads to the same values in the same conditions, but in practice there is always some variation. Reproducibility is a measure for this variation: The smaller the variation, the better. The intern had learned a formula from his school supervisor, but his work supervisor complained that this formula (the standard deviation times the square root of 2) would make the reproducibility of their method look very bad. The work supervisor was used to just using the standard deviation (without "times the square root of 2"). After

some research, it was discovered that "times the square root of 2" was only necessary when there were only two measurements, whereas there were 10 in the workplace case. So, as assumed by the work supervisor, "times 1.41" was not necessary. After some emails and conversations with both his school and work supervisors, the intern concluded that the concept of reproducibility was more complex than he had realized at school, and that he'd better ask at work what were the common procedures. In this way, he had made and taken several perspectives, and had presumably integrated them to some extent.

Again, such mutual reflection processes need not require communication between the involved parties. Digital communication can assist in stimulating such reflection. Zitter, de Bruijn, Simons, and ten Cate (2012) describe how Moodboards were introduced to facilitate the exchange of views between student project teams and clients. In addition to the aforementioned coordinative functions of smartphones, Akkerman and Filius (2011) show how phones can be used to facilitate reflection on different perspectives. This may require a school-based setting or supervising time where content or questions can be discussed.

In the coordination examples, we have pointed to the possible role of boundary objects. Research on *Techno-mathematical Literacies in the Workplace* (Hoyles et al., 2010) has shown that boundary objects can also be used for promoting perspective making and taking, in this case of mathematical or statistical orientations on work processes so as to make production more efficient. Hoyles et al. (2010) co-designed, with workplace trainers, so-called *technology-enhanced boundary objects* (TEBOs)—computer tools that imitate key boundary objects used at work, but then have the possibility to engage with the mathematical background involved. Examples are statistical process control charts (Bakker, Kent, Noss, & Hoyles, 2009) and spreadsheets of pensions (Bakker et al., 2011). By formulating and engaging with their mathematical background, employees better understood production processes, which helped communication across practices, for example with managers and clients. Resituating this approach in VET, Bakker et al. (2014) designed a computer tool with which future laboratory technicians could engage with the mathematics of dilution and chemical concentrations. Use of this tool in their learning processes proved to be both effective and efficient.

Transformation

Finally, boundary crossing can entail transformation. In that case, existing practices change and new ones can even emerge. Collaboration between educational institutions and companies sometimes leads to new practices, such as hybrid learning arrangements (Zitter & Hoeve, 2012). A concrete example is the Water Factory discussed in this chapter. A humbler example of transformation is the change witnessed in one laboratory program (Mekes, 2012). Several years ago, there was often much time between the moment when students learned about the theoretical background of measuring techniques and the moment when they applied these techniques. However, teachers of a clinical chemistry variant of the program (for laboratory technicians in hospitals) have rearranged

the program in collaboration with the work supervisors of the surrounding hospitals. In projects of 8 weeks each, the interns learn the theoretical background of a particular machine at school (one day per week) and learn to apply it for the rest of the week in their workplaces. This new arrangement implied that supervision in all affiliated hospitals had to be aligned because all interns had to work with the same types of machines in the same time blocks. Although there is still room for improvement, interns, teachers, and work supervisors are satisfied with this new way of educating the interns.

Not only practices can be transformed, but also individuals. During visits to laboratories, we often heard from work supervisors how interns entered the workplace as students who missed their peers and were often late, but left as adults engaged with the business they worked for. Many of them were offered a job where they did their internship. Tanggaard (2007) cites an intern:

> In trade practice, it's kind of an adult life. We talk about house prices, television programmes and having children. In high school, they only talk about girls and parties. Of course we still do that ourselves at trade vocational school, but we earn more money and leave home, and anyway, it's not just about money, I think we are becoming more mature. (p. 460)

Boundary Crossing: Empirical Examples

Having presented our theoretical framework of boundary crossing, we now turn to two empirical examples from our own research with the more general intent to show how the learning potential of the boundaries between school-based and work-based settings can be used. Both examples concern senior secondary vocational education (MBO), which in the Netherlands prepares for higher professional education (bachelor level). We concentrate on the school-based variant of MBO (called BOL), in which students are more at school than at work (at least 60%), at least in their early years. In their fourth and final year, they do internships. During these work placement periods, they only return to school for one day every 2 weeks (release days). The first example is descriptive (based on Akkerman & Bakker, 2012a); the second is about an intervention based on the boundary-crossing literature in which connections were made between the statistics taught at school and the statistics as used in the hospital laboratories (based on Bakker & Akkerman, 2014).

The second example also serves a broader purpose: to illustrate how VET could address the question of generalized knowledge. As a response to the perceived lack of relevance of general knowledge in VET, there has been a trend to downplay its importance. However, many VET scholars have argued for "reclaiming knowledge" (Muller, 2000), "bringing knowledge back in" (Young, 2007), and "why knowledge matters" (Wheelahan, 2012). How can educators both respect the integrity of the knowledge developed within the boundaries of a discipline such as mathematics or statistics while also helping students to make connections between such disciplines with workplace practice?

Boundary Crossing During Internships

To explore the challenges of school-to-work transitions in the context of VET empirically, we conducted a study focusing on internships as an intermediate activity between school and work (Akkerman & Bakker, 2012a). By *internships*, we mean here work placements, often with a small fee. Internships have been identified for a long time as valuable learning and working trajectories for making successful transitions and relations between school and work. However, internships are typically located conceptually as activities taking place solely in the workplace, with hardly any attention to what students do and learn during release days back at school (Poortman, 2007; Reenalda, 2011). In line with the described theoretical framework of boundary crossing, we conducted a study in Dutch senior secondary vocational laboratory education. This study determined the differences in epistemic cultures and identity positions that interns encountered between the school and work practices they engaged in during their internship, and investigated whether and how continuity was promoted by the release days in which interns go back to school to discuss and reflect upon their work experiences with other students and teachers. For this study, we conducted interviews with interns, teachers, and workplace supervisors; conducted visits to workplaces of four interns; and observed several release days at school.

The findings reveal that students experienced large differences between school and work, especially from an epistemic perspective. They reported to be educated as laboratory technicians doing much manual work at school, whereas in the workplace they experienced functioning as "operators of machines," which to them seems to call for a different expertise. Interestingly, teachers and workplace supervisors alike emphasized the importance of students not only learning what to do when, but also understanding how and why specific decisions were made in the laboratory. According to these actors, the latter also required statistical knowledge and questioning. This, however, seemed not to be apparent for the interns. Our observations of the workplaces helped to explain this. What students were expected to learn in work practices regarding statistics in laboratory work was largely rendered invisible by the technology-mediated, scripted, and socially distributed nature of their work. We concluded that work practices as such may not only open up learning opportunities, but also may come to function as "black boxes" (Latour, 1999). We found the observed release days to establish some continuity between school and work as they enabled reflection on work experiences and generated new school–work interactions such as information gathering at work for the school presentations and passing on questions received from students and teachers. Based on the findings, we concluded that there also seems more to gain in exploiting release days for crossing the school–work boundary, specifically in terms of opening the black box created by the technology-mediated, scripted, and distributed system of knowledge working. We propose this can be done by explicitly questioning the how and why of core processes in laboratory work, with students forming informed and legitimate reasons in discussions with students and teachers at school to ask more in-depth questions at work. Stimulating students to ask critical and reflective questions at labs could go along with accepting that teachers do not have to know everything,

but that they can adopt the role of coach. This is especially relevant as one cannot expect school to be continuously up-to-date with the seemingly rapid developments at work, which in the case of laboratory work typically concerns many successive technological changes.

An Intervention to Promote Boundary Crossing

Based on the insights about learning mechanisms summarized in this chapter, and the findings from the study also described, we designed a modest intervention for students who did an internship at hospital laboratories (Bakker & Akkerman, 2014). The research question we asked was how boundary crossing between school and work could be shaped such that students' learning processes at school and at work could increasingly be integrated. Although there are theoretical accounts of integration (Baartman & de Bruijn, 2011; Billett, 2014), interventions to promote such integration are scarce.

The first concrete problem that we intended to tackle was that students, according to their supervisors, found it hard to use the statistics they had learned at school during their internship. Second, schoolteachers reported that students had mostly forgotten what they had learned about statistics in their first and second years by the time they arrived in their fourth year. Moreover, schoolteachers criticized the statistics curriculum for being too much oriented toward general education students rather than vocational students, and hence not enough tailored to students' future work as laboratory technicians (see also Chapters 13 and 14, this volume). Third, from a survey of about 300 interns from laboratory schools, we knew that over 30% thought they had learned less mathematics and statistics than they needed during their internships (Bakker, 2014). This is not so surprising when we note the large difference between what is typically taught about statistics at school and what is required in the workplace (Bakker, Kent, Derry, Noss, & Hoyles, 2008).

The learning goal of our intervention (reported in Bakker & Akkerman, 2014) was that the participating three students of clinical chemistry would learn to integrate the statistical knowledge learned at school with the statistics required to carry out research tasks during their internship in a hospital laboratory. The intervention consisted of five 1-hour meetings during release days. To give a sense of the different perspectives that students had to integrate, we give an example of method comparison, a common research task during internships in hospital laboratories. A core task of technicians is to determine concentrations of chemical substances. Here, we give an example of measuring the concentration of a protein in patients' blood with Machine A and its accompanying measurement guidelines. The laboratory wants to know if the measurement can also be done with Machine B, which is faster and cheaper. An intern is asked to do the method comparison to check if Machine B leads to the same measurements and whether these measurements are stable and reproducible. To do this method comparison, interns needed statistics that they had learned at school: variation coefficient, correlation, and regression (school perspective). However, they did not quite know how to make the connection with method comparison, which focuses on stability, reproducibility, and linearity (work perspective).

As a basis for our intervention, we formulated the following starting points:

a) Given the criticism about the one-directional and individual take on transfer of individual knowledge, it is necessary to take a *broader stance.* Hence, we promoted not only students' boundary crossing, but also that of supervisors and teachers. Supervisors were invited to one of the meetings where a teacher also was present.

b) We looked for a *boundary object* that could provide connections between the school and work practices of students, and we found an internship report of a former student, who did a method comparison the year before. Such reports have a double function. They serve the workplace's concern about some topic (measurement of patient blood with a new machine), but also act as the source of assessment of the internship. In our intervention, we used the report also as an object of reflection. The work supervisors knew the report, and the students knew it was an example of something they were most likely going to encounter in their internship.

c) The intervention primarily promoted the learning mechanism of mutual *reflection.* Based on the aforementioned internship report, students prepared questions for the visiting work supervisors. Students also investigated newly raised issues from their own laboratories. We expected that these activities would help them define and exchange work- and school-based perspectives on statistics.

d) As such, students were stimulated to become *boundary crossers*, taking information from one place to the other, and raising questions in one context and discuss answers in the other, and vice versa.

We hoped that these intervention features would instigate the mechanism of *transformation*, in this case hybridization of the students' perspectives. To test if students had indeed integrated perspectives, we have developed an analysis scheme to measure knowledge integration levels. Analysis of 201 episodes across the five meetings shows that the increase in integration level was indeed statistically significant, with medium effect size (see Bakker & Akkerman, 2014).

We give a few small examples of what was discussed during the meetings. First, students had learned statistical tests to detect outliers (e.g., Dixon's Q and Grubbs). They discovered, however, that these tests were hardly used in laboratories. Whether a value is an outlier is mostly clear from the context—something goes wrong during measurement. Students explicitly addressed this issue with their work supervisors, who confirmed their initial impression.

Another example concerned what counts as an acceptable correlation coefficient. One work supervisor who had attended the third meeting had mentioned 0.9 as the minimum. One student thought this was rather low, and the students were encouraged to ask about this issue in their own laboratories. They reported back that 0.99 was more common as a minimum value. This led to discussion of precision of different chemical substances. A student gave an example of a substance that can be deadly with too high concentrations, so its precise measurement is of vital importance. In this way, a concept such as correlation coefficient gained a broader meaning for the students.

It is thus possible to promote the learning mechanisms of mutual reflection and transformation by means of curricular interventions. Of course, additional research is necessary to investigate how such proofs of principle can be implemented at larger scales.

Boundary Analysis as a Heuristic Toward Curriculum Redesign

So far, we have used the concepts surrounding the central idea of boundary crossing—boundaries, boundary crossers, and boundary objects—primarily as *sensitizing concepts* (Blumer, 1954). These concepts help scholars and practitioners get a sense of what matters in the complexity of learners within interacting practices. Together with the empirical findings categorized in terms of learning mechanisms, these concepts form a theoretical framework, but not a prescriptive theory that will predict what will happen in specific situations. The step toward the redesign of VET curricula is therefore always indirect. For example, Wenger (1998) writes, "Learning cannot be designed.… And yet there are few more urgent tasks than to design social infrastructures that foster learning" (p. 225). So, it is worthwhile to try to derive heuristic guidelines from the boundary-crossing literature.

Stakeholders in creating or improving VET curricula may not always be aware of the discontinuities within and around their organizations, and people with whom they are working may not always share the small and local discontinuities in action or interaction when improving a curriculum. In this light, it may be useful to do what we call a *boundary analysis* (Akkerman & Bakker, 2012b; Bakker, Zitter, Smit, & De Bruijn, 2016). By this, we mean that stakeholders study the social network within and around their own practices. Based on an analysis using the aforementioned boundary concepts, they may be able to identify potential problems and solutions. Small and local annoyances, such as miscommunication, different opinions, and delays of decision and action, may be signals of larger scale frictions between activity systems or practices. It may be useful to identify the role that existing brokers and boundary objects already play in connecting practices. Are these objects and people recognized as such? Investigating more systematically which boundaries between school and work practices are experienced by different people, including learners and supervisors, may be necessary to use unused potential. Such potential may take different forms. When responsibilities need to be formulated more clearly, the mechanism of identification is at stake. For better coordination, procedures may need to be aligned. Mutual reflection can be stimulated by perspective making and taking. In some cases, changes have to be more fundamental; transformation may be necessary to shape new hybrid practices.

The previous paragraph summarized the idea of a boundary analysis as a heuristic device—a theoretically founded heuristic to tackle problems or suboptimal processes at the boundaries between practices such as school and work (Akkerman & Bakker, 2012b). After redesigning VET curricula, proper

problem analysis seems crucial. We have tried such boundary analyses with VET stakeholders in workshops, but have not studied them in a scholarly way (Bakker et al., 2016). Further research in this direction seems fruitful.

As a boundary analysis is a heuristic device and is not meant as a linear procedure to be followed, we suggest the following questions should be addressed when people think that experienced problems are due to boundaries and want to think about how to draw on their learning potential:

1) What problems or innovation challenges are experienced due to differences between practices?
2) In which practices do you participate?
3) What are the other practices relevant to these problems or innovation challenges?
4) Which boundaries are experienced by whom?
5) Which of these boundaries have learning potential?
6) Which mechanisms can set learning into motion?

Question (1) is intended to demarcate the problems or innovation challenges to be resolved at the boundaries of practices. Questions (2) and (3) broaden the scope of stakeholders to sensitize them for all relevant practices involved. There are several reasons to include questions on practices. In line with sociocultural and cultural-historical theories, we think that the learning course of individual students, interns, or apprentices cannot be well understood without a wider view on the practices in which they participate. When learners experience transition problems, these are typically not just an individual matter, but also an issue of how the relevant practices are organized. Hence, any solution should require not just the support of individuals making transitions but also awareness of the organizational issues that impact these transitions (Konkola et al., 2007).

Question (4) requires stakeholders to think about differences that are experienced as boundaries. In pondering this question, they may realize that different people may encounter different boundaries; some boundaries may be partial or temporary. Question (5) requires a judgment of where the potential lies. It resonates with famous lines formulated by Reinhold Niebuhr and used by Alcoholics Anonymous: "Grant me the serenity to accept the things I cannot change, the courage to change the things I can, and the wisdom to know the difference" (https://en.wikipedia.org/wiki/Serenity_Prayer). Question (6) asks for a judgment of the mechanisms that can be drawn upon. Knowledge of the literature on boundary crossing can inspire people to predict whether boundary crossers, boundary interaction, or boundary objects are needed.

Discussion

In this chapter, we have argued that transitions between school and work settings do not just form an area full of discrepancies and transfer problems. Indeed, there are plenty of differences between school and work, but they are not to be evened out. Alignment between school and work does not mean that school

should become a bleak version of work (Säljö, 2003). Rather, we have argued for using the learning potential of boundary crossing—the efforts that people make when dealing with boundaries as part of a vocational curriculum.

We have described four learning mechanisms that we have found in the literature and in our own empirical work in studying vocational curricula: identification, coordination, mutual reflection (perspective making and taking), and transformation. We have also hinted at how VET can capitalize on these mechanisms by means of learning arrangements or interventions that do not treat school- and work-based learning as sequential and isolated, but rather as integrated and coherent. Taking the unit of analysis as broader than an individual performing tasks and moving from school to work implies that our focus was not just on students' or interns' efforts in boundary crossing, but also on surrounding supervisors and broader organizational structures as well as boundary objects.

Intuitively, one might assume that boundaries have to become permeable or even erased. Theories on situated learning are often drawn upon to make VET programs more authentic, that is, workplace-like. Indeed, boundaries can fade in such attempts (Wals et al., 2012), and positive experiences have been reported about hybrid learning environments or boundary practices (Aalsma, 2011; Cremers, 2016). Yet the differences in the epistemic nature of school and work settings should not disappear (Berner, 2010). These different settings offer complementary contributions to learning (Aarkrog, 2005; Poortman, 2007; Schaap, Baartman, & de Bruijn, 2012).

These considerations imply that boundaries will always continue to exist. In whatever way practices are organized, there will always be boundaries around them that hold them together (Wenger, 1998). This also holds for disciplines with a long tradition, such as mathematics or cooking. So, boundaries are necessary, even if they sometimes hinder continuity. We hope to have convinced the reader that boundaries also have learning potential because of the challenges that they entail. Efforts will always be necessary, and hence the concept of boundary crossing will remain relevant in VET, in whatever way it will be organized. Even in hybrid learning environments, where school- and work-based learning are brought together, many boundaries still have their function, and many forms of boundary crossing are still needed (Zitter et al., 2016).

Finally, we formulate a possible agenda for future research. First of all, research on school-to-work transitions in VET has tended to focus on sociological issues such as the increasingly extended and risky nature of those transitions (Evans, 2002, 2007) and the ways in which class, gender, and race can skew youth transitions (France & Roberts, 2017). To our knowledge, there are few descriptive and interventionist studies in various VET systems that may provide a sound empirical basis for knowledge on how to improve the situation. Studies on how to bring general knowledge back in and help students draw on such disciplinary knowledge are much needed, not only in workplace training (Hoyles et al., 2010) but also in VET. Second, small-scale interventions (Bakker et al., 2014; Bakker & Akkerman, 2014) could be applied and evaluated

on a larger scale. In particular, more research on hybrid learning environments is welcome, because different boundaries are at stake than in more traditionally organized VET curricula (Cremers, 2016; Heusdens, Bakker, Baartman, & De Bruijn, 2016; Zitter et al., 2016).

In relation to the key concepts addressed in this chapter, many questions are still open:

- Are there any patterns in the order in which learning mechanisms occur? For example, it seems plausible that coordination—getting something done together—is a good starting point for changing practices. Furthermore, perspective making and taking seem conditional for transformation (Akkerman & Bruining, 2016; Bakker et al., 2016).
- How do the learning mechanisms interact over time at different institutional, interpersonal, and intrapersonal levels (Akkerman & Bruining, 2016)?
- What are the characteristics of successful boundary crossers?
- In what cases do boundaries have learning potential?
- Under which conditions are which learning mechanisms most productive?

We hope that, in the coming years, answers to these questions will help improve vocational pedagogy and VET curricula.

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Designing Technology-Enhanced Learning Environments in Vocational Education and Training

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Introduction

Societies and economies all over the world are currently experiencing substantial transformations driven by, among other things, the synergy of combining the information and communication technology revolution with the globalization of the economic system. Many contemporary work practices are already mediated by technologies (Engeström, 2009). Some practices capitalize on the automation of tasks that are repetitive or complex and require computation. Others exploit technologies to enable people to collaborate in radically new ways (Nickerson, 2013). For example, in many places, it is now usual for people to collaborate across conventional geographic, disciplinary, organizational, and sectoral boundaries (Bietz, Baumer, & Lee, 2010). Given these developments are, to a large extent, altering the required qualifications of today's and tomorrow's employees, it is imperative to rethink the goals and content of vocational education and training (VET). This chapter explores the contribution of technology-enhanced learning environments (TELEs) and how they are enacted at the micro level (i.e., the level of concrete learning and teaching activities) (Littlejohn & Margaryan, 2013; OECD, 2015). According to Dettori (2008), TELEs refer to

> learning environments where ICT tools are used to support and facilitate learning. Technology, however, is not the focus of the learning process, nor is it all a student needs to learn in such environments. The TELE is rather a scenario comprising learning objectives, tasks, learning materials, tutors, teachers, other students and technology. In this scenario learners can play an active role in their own learning process. (p. 584)

We prefer to use the term *TELE*, rather than computer-assisted instruction (CAI), computer-aided learning (CAL), networked/online learning, or e-learning, because it is more clearly focused on learning than on technology, and puts the need for functionality at the center of attention. Consequently, the goal of the chapter is to demonstrate how TELEs can be used to effectively support learning and teaching processes in VET.

Using technology to help other people learn is a complex undertaking, and thus needs to be approached deliberately and systematically. That is why we, along with others (Goodyear, 2015; Laurillard, 2012), speak of design. Among other things, a good design requires the appropriate consideration of the learning context. In the "Potential of TELEs in VET" section, we elaborate how TELEs fit into the VET context. We do this by adopting a specific theoretical perspective, namely, a connectivity and boundary-crossing perspective, which particularly highlights the need to integrate VET learning and teaching across different learning sites. The "Applications of TELEs in VET" section that follows is then devoted to the description of different forms of TELEs currently used in VET. More specifically, we address mobile learning, visual and web-based technologies, as well as tangibles and digital simulations as tools to support learning and teaching across the different sites. The chapter ends with some reflections on the available research and an outline of future directions for TELEs in VET.

Potential of TELEs in VET: A Connectivity and Boundary-Crossing Perspective

Given the trends discussed here, there is a broad consensus in current debates that VET cannot be limited to superficial knowledge acquisition or rote skills learning, but needs to address complex and broad-ranging learning goals such as the development of professional competence and identity as well as employability, social responsibility, and participation (Dall'Alba, 2009; Gratton, 2011). Moreover, it is also widely agreed that these encompassing learning goals are best obtained by combining different forms and sites of learning. Despite their differences, most VET systems foresee an alternation between two different learning settings: educational settings and workplace settings (Fuller & Unwin, 2011; Guile & Griffiths, 2001; Konkola, Tuomi-Gröhn, Lambert, & Ludvigsen, 2007). Consequently, the need to foster the connection among these settings and to develop learning environments that effectively support this connection has become a prevalent concern in VET practice and an important topic in VET research (Ludvigsen et al., 2011; Tuomi-Gröhn & Engeström, 2003). More specifically, this topic is center stage in contemporary connectivity and boundary-crossing approaches (see Chapter 18, this volume). In this section, we (a) summarize key assumptions of how these approaches conceptualize the relationship between school and workplace settings, (b) describe the characteristics that they attribute to each setting, and (c) outline the way in which they conceive technologies as means to integrate learning across these settings.

Key Assumptions on the Relationship of Different Learning Settings

The issue of conceptualizing the relationship between school and workplace settings has traditionally been approached as a transfer problem, and much of the discussion has focused on how to overcome differences and gaps between these settings (Middleton & Baartman, 2013; Tuomi-Gröhn & Engeström, 2003). From this perspective, great efforts should be made to make school as similar as possible to the workplace so as to completely anticipate at school what learners will meet in the workplace (Biemans, Nieuwenhuis, Poell, Mulder, & Wesselink, 2004; Finch, Mulder, Attwell, Rauner, & Streumer, 2007). Many scholars have criticized this approach as being too simplistic and mechanical, mainly due to its one-way view of relating the different learning settings and its overemphasis on the decontextualized nature of knowledge and skills (Billett, 2014; Griffiths & Guile, 2003, 2004; Tuomi-Gröhn & Engeström, 2003; Tynjälä, 2008).

In contrast, a more "relational" and "dialogical" perspective of learning across school and workplace settings has been developed more recently within the connectivity and boundary-crossing approaches. It is predominantly based on tenets from situated and sociocultural theories (Beach, 1999; Lave & Wenger, 1991), cultural-historical activity theory (CHAT) (Vygotsky, 1978), and the specific work on boundary objects by Star and Griesemer (1989). The focus of these approaches shifts from how to overcome differences between school and workplace settings to how relations between those settings can be established and maintained despite the sociocultural differences existing between them. The metaphor of *boundary crossing* is considered as particularly appropriate to describe the dialogical nature of learning across different settings (Akkerman & Bakker, 2011; Middleton & Baartman, 2013). From this perspective,

> school and work can be seen as constituting distinct practices, with different aims (schooling and working) and with different cultural and local histories. These differences can lead to discontinuities for the student, as they may be required to make a shift in role, perspective, or type of expertise to draw on, when moving from school to work or vice versa. Simultaneously, however, the concept of boundary suggests some sameness and some continuity in the sense that two or more sites are relevant to one another in a particular way. (Akkerman & Bakker, 2012, p. 155)

Given these considerations, the specific characteristics of each setting become crucial, and so we now discuss these.

Characteristics of Different Learning Settings

In compliance with their CHAT background, connectivity and boundary-crossing approaches conceptualize schools and workplaces as two interacting activity systems that are constituted by various elements: subjects, objects, rules, communities, division of labor, and mediating artifacts (see Figure 19.1) (Engeström, 2001; Konkola et al., 2007). As such, both learning settings have specific affordances and constraints (Greeno, 2011).
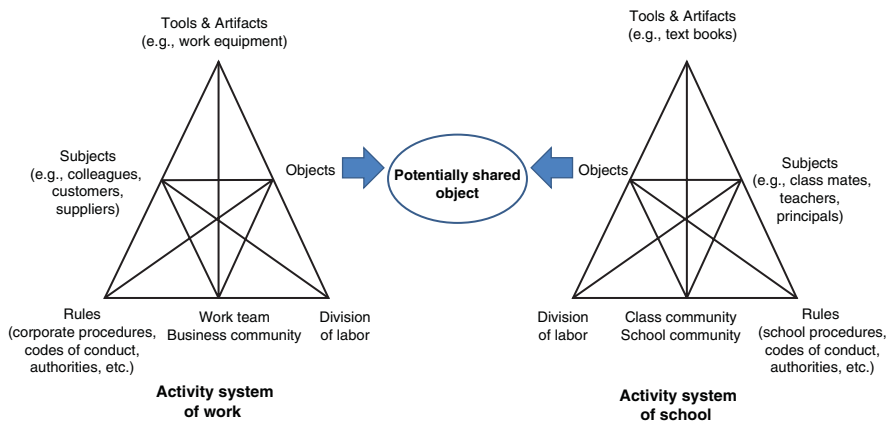
Figure 19.1 Schools and workplaces as two interacting activity systems.

According to Billett (2007), the strength of the workplace lies in the fact that learning is made possible through the participation and execution of activities within authentic situations. These situations are primarily not aimed at learning, but pursue a production-related goal (efficient production of goods and/or services) and action logic. Depending on the degree of novelty of the situation and the activity to be performed, this participation allows new learning as well as deepening, refinement, and practice of already-existing mental resources (knowledge, skills, and dispositions). Billett (2007) states,

> Encountering a new task and engaging in it purposefully can lead to new learning, because it extends what individuals know. Yet learning in the form of reinforcement and refinement (i.e. improving) is secured through performing familiar tasks. Through opportunities to practice and improve, individuals are making increasingly mature approximations of the tasks in which they are engaging. (p. 3)

Learning at the workplace is also supported by the availability of external resources in the form of explicit instructions by experienced colleagues (direct guidance) as well as through the possibility of implicit learning (indirect guidance). Billett (2007) affirms the contribution of the latter by drawing attention to the "physicality of the workplace that provides clues about and cues for how work has to be practiced, the standards required and the means for conducting that work," but states that for such clues to be useful, they have to be "accessed through learners' engagement" (p. 4).

However, despite this potential, workplace learning can also be problematic for a number of reasons. In addition to the lack of availability, inadequate skills, and the competitiveness of the contact persons responsible for the learners, a difficulty lies in the fact that the necessary knowledge and skills are not required or cannot be observed (Billett, 2007). In addition, workplace settings often do not reflect the variability of procedures and strategies in the context of professional activities. As empirical findings (Eraut, 2004; Tynjälä, 2008) show, it is sometimes

not possible to stimulate the learning processes necessary for a comprehensive understanding of professional activities, especially the relevant conceptual knowledge.

In contrast, these aspects, which are of particular importance when it comes to not only carrying out but also innovating work processes, can be considered as the potential strength of school-based learning settings. As Young (2008) points out, from an educational sociology perspective, school-based learning has a critical-reflexive function, which emphasizes, above all, the social conditionality of all knowledge. He describes the goal of the school-based learning setting as follows: "to enable students to acquire knowledge that: (i) is not accessible to most people in their everyday lives, and (ii) enables those who acquire it to move beyond their experience and gain some understanding of the social and natural worlds of which they are a part" (Young, 2008, pp. 164–165).

Technologies as Boundary Objects to Integrate Learning Across Different Learning Settings

Against the background of what has been said so far, schools and workplaces could be considered as complementary learning settings. However, as scholars from connectivity and boundary-crossing approaches stress, combining these settings in order to exploit their respective advantages and to promote integrated vocational learning does not happen automatically, nor is it a mechanical or unproblematic endeavor. Quite the opposite, as it implies multiple and complex processes of "re-contextualization" (Van Oers, 1998) and of continuous "transformation" (Beach, 2003), in which knowledge is generated across social activities rather than simply transferred from one situation to another (Griffiths & Guile, 2003, 2004; Middleton & Baartman, 2013). In the connectivity and boundary-crossing literature (Akkerman & Bakker, 2011; Baartman & de Bruijn, 2011; Tynjälä, 2009), the following processes are particularly highlighted:

1) *Awareness and identification:* A first important step is that learners deliberately perceive and identify the experiences they encounter in different practices within and across different learning settings. This should ideally be done in such a way that the entire range of different nuances of a specific professional activity can be depicted (e.g., storage of various types of goods such as books versus fresh produce). Similarly, as many relevant aspects as possible of a particular occupational situation (e.g., materials and tools used, and interactions with colleagues) should be made visible.

2) *Coordination and documentation:* To fully exploit the potential of combining different learning sites, it is also necessary to reconcile the experiences made in those sites. This specifically includes, according to Akkerman and Bakker (2011), efforts of translation in the sense of negotiating what things mean at different sites. In addition, it is crucial to provide communication structures and documentation tools that allow adequate exchange and storage of information between different learning settings.

3) *Reflection and transformation:* The development of complex learning outcomes (e.g., professional competence and identity) does not happen by mere

experiences alone, but requires reflection and transformation of these experiences. This is done, for example, by inviting the learners to share experiences with others and thus illustrate them through other examples, to compare similarities and differences in the performance of the activities, to submit them to a critical appraisal, and to classify the learning contents into the larger context of the knowledge domain.

These primarily cognitively oriented learning activities are intended not only to facilitate the integration of the content distributed over the learning settings, but also to support their gradual generalization, especially when reinforced by metacognitive and motivational processes (Baartman & de Bruijn, 2011; Tynjälä, 2009).

Given the multitude and complexity of these processes, learners need to be supported in acquiring and transforming their knowledge and skills to make them flexible across the different learning settings and, in the long run, applicable to different work situations. As indicated in Figure 19.1, this is the point where technologies come into play, as they are seen as one potential means to serve as a so-called boundary object. According to Star and Griesemer (1989), *boundary objects* are

those objects that both inhabit several intersecting worlds and satisfy the informational requirements of each of them.… [They are] both plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites. They are weakly structured in common use, and become strongly structured in individual site use. (p. 393)

Based on this definition and on the work of Star (2010), Akkerman and Bakker (2011) argue that

it is not only interpretative flexibility that turns objects into boundary objects; boundary objects are organic arrangements that allow different groups to work together, based on a back-and-forth movement between ill-structured use in cross-site work and well-structured use in local work. (p. 141)

Boundary objects can thus be considered as "a means of translation" (Star & Griesemer, 1989, p. 393) within a situation of multisite activity relations and requirements.

It is, however, generally recognized that for technologies to serve as boundary objects to support VET learning and teaching across different learning settings, they have to be embedded within a carefully designed learning environment (Schwendimann et al., 2015; Tynjälä, Häkkinen, & Hämäläinen, 2014; Zitter, Hoeve, & de Bruijn, 2016). Examples of how this could be done will now be further elaborated in the remainder of this chapter.

Applications of TELEs in VET: Tools to Integrate Learning and Teaching Across Different Learning Settings

In this section, we will illustrate how TELEs could function as boundary objects to integrate learning and teaching across different learning settings in VET. As already indicated in the introduction, we will specifically focus on mobile

learning, visual technologies, web-based technologies, tangible objects, and digital simulations. These sample technologies support the processes referred to in this chapter in different ways. Whereas mobile and visual technologies potentially facilitate all of them, web-based technologies mainly assist coordination and documentation as well as reflection and transformation. In contrast, tangible objects and digital simulations seem to be specifically helpful with respect to awareness and identification. To elaborate the expected way of functioning of those technologies, we will describe their key characteristics and expected benefits for learning and teaching in VET. Where applicable, we will also sketch selected empirical evaluation results, including available recommendations for the design and implementation of the respective technology.

Mobile Learning

Although an ultimate definition of *mobile learning* is not yet available, we follow Crompton (2013) by assuming that it encompasses "learning across multiple contexts, through social and content interactions, using personal electronic devices" (p. 4). This definition emphasizes the fact that mobile learning happens across locations, giving learners the possibility to connect formal and informal learning (Sharples, Arnedillo-Sánchez, Milrad, & Vavoula, 2009; Terras & Ramsay, 2012), and educational and everyday contexts, thus fulfilling the possibility of authentic "seamless learning" (Pachler, 2009).

As a second characteristic, mobile devices have been repeatedly identified as a distinctive trait of mobile learning. Learners can use mobile devices (e.g., by taking pictures, collecting audio notes, etc.) to bring their (workplace) experiences into the school to actively and collaboratively engage in a meaning-making process, resulting in what Cook (2007) calls "user-generated contexts." The specific benefits of mobile devices are, for example, portability, availability beyond time and space, ownership, computing power, small screen size, ease of use, adaptability, accessibility, multimedia convergence, connectivity, social interactivity, context sensitivity, and location awareness (Lai, Yang, Chen, Ho, & Chan, 2007; Pachler, Bachmair, & Cook, 2010; Pea & Maldonado, 2006; Sharples, 2000; Song, 2011; Wright & Parchoma, 2011). As Lai et al. (2007) suggest, this long list can be consolidated into two major advantages: (a) the real-time information access (whenever and wherever needed), and (b) the rapid-access interface for note- and photo-taking as well as sound- and video-recording.

However, as scholars in the field (Park, 2011; Sharples et al., 2009) consistently emphasize, the effective design and implementation of mobile learning in VET require careful consideration. Three important aspects can be highlighted in this regard: (a) the role *learners* take, including creativity, collaboration, and communication more than simply delivery (Kukulska-Hulme, Sharples, Milrad, Arnedillo-Sànchez, & Vavoula, 2011); (b) the need for *guidance and support*, revealed in specifically designed learning activities that "include those concerned with data capture, exchange, and sharing, or those sharing imagery, ideas, and thoughts to provoke discussion" (Passey, 2010, p. 69); and (c) the *technological tools*, which work best in a combination of mobile devices and desktop

or cloud solutions (Parsons, 2011). This "learning hub" approach (Wong, 2012) constitutes a blend of technologies that easily supports cross-boundary learning. For example, it is often the case that a "Personal Learning Environment" or an e-portfolio is combined with mobile devices (Chan, 2011; Kukulska-Hulme et al., 2011; Stone, 2011), to support learners to fully exploit the affordances of mobile devices.

This was also the approach used in a 3-year study within initial VET with two classes of chef apprentices (*n* = 45) in the Italian-speaking part of Switzerland. Apprentices spent one day per week at school, and the rest of the week at their apprenticeship workplace, which could vary a lot from case to case, including from small to high-ranked restaurants or huge company canteens (Cattaneo, Motta, & Gurtner, 2015; Motta, Cattaneo, & Gurtner, 2014; for a similar experience with bakers, also see Mauroux et al., 2016; Mauroux, Könings, Dehler-Zufferey, & Gurtner, 2014). Chef apprentices had at their disposal a "learning hub," allowing them to take pictures of their productions at the workplace through a specific app on their smartphones and reuse the pictures in a web-based environment to develop their book of recipes as well as their reflections on what they had practiced. Both the teacher at the vocational school and the supervisors at work could enter the environment, which constituted therefore a real boundary object for all the stakeholders involved. Following the recommendations of Sharples (2009), we investigated the acceptance of the system, investigating usability, effectiveness, and satisfaction.

Usability was not a concern at all for the users. This was validated both by the fact that they reported no problems with using the system and, more interestingly, by the fact that the number of recipes they put in their personal online collection (into the form of an e-portfolio) constantly increased over time. Effectiveness was also shown. We could measure (a) a significant increase in declarative knowledge acquisition assessed through the use of traditional learning tests at schools; (b) a significant improvement of metacognitive skills acquisition through the content analysis of their online productions based on a coding scheme compliant with *previous research;* and (c) a significant improvement of their mastery in practice measured through the execution of a real cooking task assessed by two professionals. With respect to satisfaction, apprentices considered the learning activities useful not only for learning and practice, but also for improving and fostering the link between workplace-based experiences and school-based activities. Such an impression is also shared by other stakeholders (teachers, supervisors, inspectors, cantonal officers, and corporate association representatives) who took part in the project. Additionally, the study showed mobile learning to be flexible, as we designed and tested several pedagogical scenarios within the general framework.

Generally, mobile technology allowed apprentices to assume a creative-generative role with respect to the contents included in the curriculum and to capture visual evidence in the workplace in a structured way that could be examined in the classroom under the teacher's guidance (see also Hämäläinen & Cattaneo, 2015) and shared across workplaces among the apprentices. It also allowed new conversational paths between the teacher and the in-company supervisors, constituting a new way to involve the companies in school life.

Visual Technologies

In the previous section, we described how pictures or videos could be included in mobile learning. However, visual technologies constitute a powerful learning tool in their own right. In this respect, we are referring not only to general principles such as the "picture superiority effect" (Kirkpatrick, 1894) but also to the fact that, especially in VET, visualizations can be used to promote what Goodwin (1994) calls "professional vision," that is, "socially organized ways of seeing and understanding events that are answerable to the distinctive interests of a particular social group" or profession (p. 606). In this sense, instructional visual displays perform five main functions (Schraw & Paik, 2013; see Clark and Lyons [2004] for a common classification of the communicative and psychological functions images can play): (a) They reduce the information flow so that it is manageable, promoting cognitive economy; (b) they organize and summarize information; (c) they focus the viewer's attention on the most important and salient aspects of the information; (d) they facilitate inferences, highlighting meaningful relations among the variables composing the displays; and (e) they provide an explicit visual model of events or processes that can be used to build one's own internalized mental model.

In addition to these general advantages of visualizations, technology offers some additional affordances, for example to support comparison. Contrasting similar or different cases is a well-known strategy to foster learning (Schwartz & Bransford, 1998). Applied to visualization, this can be enacted by juxtaposition (when the objects are shown together but separately), superposition (when they are overlaid in the same display), and explicit encoding of relationships, including cueing and the possibility of explicit annotation (Gleicher et al., 2011). In a recent study, Caruso, Cattaneo, and Gurtner (2017) showed the instructional value of using superposition and annotation on pictures to develop observation skills in initial VET with apprentice fashion designers who attend a full-time curriculum with practice integrated within school laboratories. The use of a specifically designed online platform, Realto, resulted in highlighting the added value that technology can play with respect to traditional paper-based techniques both to enhance professional development and to empower teaching-and-learning processes. In particular, this could point out some interesting intersections between regular classes and practice labs, helping to connect the activities taking place in the two different locations.

Videos as a form of dynamic visualizations also have a long tradition within the observational learning—or demonstration-based training (DBT)—approach (Rosen et al., 2010), grounded in Bandura's (1986) social cognitive theory. This is particularly relevant to VET, as it exploits the affordances of videos to show examples of performance in order to foster the acquisition of the knowledge, skills, and attitudes required for mastering that performance. In this perspective, videos do not have to necessarily provide the perfect behavioral model, as identifying errors when performing a procedure can also be a fruitful instructional strategy in the VET context (Cattaneo & Boldrini, 2016). Grossman and colleagues provide a list of 17 guidelines to properly design DBT instruction (Grossman, Salas, Pavlas, & Rosen, 2013), including the use of cueing. When a

video integrates specific cueing markers (i.e., signals, in the form of circles, squares, arrows, etc., appearing as an additional layer over the video and focusing the viewer's attention on a specific detail or portion of the frame), it could be considered as a hypervideo, which is an instructionally richer tool. A hypervideo is a nonlinear video that presents both classical (e.g., play, pause, stop, and rewind/forward buttons) and more complex (e.g., table of contents and index) functions to control the navigation of the video stream.

Control features enable users to interact with the hypervideo in a way that best suits their needs, giving them the chance to moderate information intake (so reducing cognitive load) and to flexibly navigate the video, selecting a nonlinear trajectory through the materials. Hyperlinks provide users with a contextualization about the topic treated in the video and help them to connect theory and practice, as well as different sources of information. Moreover, as the markers are often also spatially determined, they play an important function to focus the viewer's attention. Exchange options, and video annotation in particular, constitute a useful feature to enhance reflective processes, to be enacted individually or collaboratively.

Research in VET shows the effectiveness of using hypervideos to support teaching and learning processes, especially when procedural knowledge is concerned (Cattaneo, Nguyen, Sauli, & Aprea, 2015). In this case, a very interesting affordance of (hyper-)videos is the fact that teachers can bring authentic workplace situations within their classes, either directly having them captured by their apprentices on the job, or producing and finding them for themselves. Consequently, from the teaching point of view, the hypervideo is a flexible tool to allow an instructional variety of strategies, from more teacher-oriented to more learner-centered ones, from more supplantive to more generative. Smith and Ragan (1999) argue that there is a continuum between supplantive and generative strategies depending on the degree of scaffolding and guidance provided to the student by the teacher, decreasing from the former to the latter. When used in a carefully designed way, results with respect to learning do not differ significantly depending on the adopted strategy. On the contrary, a teacher-led interactive lecture, an individual lesson where the students individually access the hypervideo, and a learning-by-design activity within which the students build their own hypervideo in groups all give similar positive results on knowledge acquisition, motivation, and transfer to practice (Cattaneo, Nguyen, & Aprea, 2016).

Web-Based Technologies

Visualizations are not the only possibility to exploit the affordances of technology in VET. In professions where a tangible and concrete product is not at the core of the daily activity, visualizations sometimes are of no or only minimal help. In this case, writing can be an effective mediating activity (Tynjälä, 2008), and web-based technologies like weblogs and wikis as well as e-portfolios could be considered as adequate support. This so-called writing-to-learn approach (Galbraith, 1999; Hayes & Flower, 1980) can be further empowered by including

collaborative writing activities. Ortoleva and Bétrancourt (2016) summarize four main benefits of technology to support writing processes: (a) dynamic storage, (b) automatic processing, (c) multimedia enrichment, and (d) collaboration and communication beyond space and time constraints. These four benefits also correspond in a way to a progression in the research and development investigations, passing from an emphasis on the individual to the collaborative cognitive processes. This latter phenomenon constitutes a substantial body of research concerning collaborative knowledge building via the so-called Knowledge Forum (Scardamalia & Bereiter, 2006; Scardamalia, Bereiter, McLean, Swallow, & Woodruff, 1989).

Knowledge Forum constitutes a complex learning environment rather than a simple tool. However, this does not mean that it is not possible to successfully use common tools like weblogs and wikis to enhance learning. In this perspective, combining a set of studies conducted within initial VET (Cattaneo & Boldrini, 2016, 2017; Mauroux et al., 2014, 2016; Ortoleva & Bétrancourt, 2016), we can see the impact that different technology-enhanced writing activities had on the acquisition of procedural knowledge as well as on the development of reflective skills and of operative mastery of the procedure. In this sense, given the usability and ease of use of the tool as a preliminary requirement, it is not a major concern to select which technology (e.g., synchronous vs. asynchronous) is best, but rather to assure that some instructional principles are attained, starting from assuring learning support and guidance, such as providing them some rubrics, prompts, or guiding questions. Once more, this allows technology-enhanced writing to become a tool to connect procedural knowledge acquired at the workplace and conceptual knowledge provided at school.

Tangible Objects

A fourth important set of possibilities to enhance VET learning through technologies is constituted by tangible objects, also referred to as *tangible user interface*s (TUIs). TUIs are physical objects that users can manipulate and that interact with computer-based technologies to profit from their computational capabilities. This manipulative affordance advantages learning in many ways. TUIs create a bidirectional bridge—in the sense that you can both decide to start from the physical toward the symbolic and vice versa—between physical objects and symbolic or abstract entities, help to build representational mapping, foster the connection between external and internal representations, activate learners, and facilitate collaborative activities. The usual combination of TUIs with augmented reality systems further increases these affordances, especially in the direction of providing users with multiple external representations (Ainsworth, 2006) and dynamic linking between such representations, with beneficial effects in terms of diminishing the cognitive load (i.e., the amount of mental effort being used in the working memory).

Empirical studies with TUIs have been conducted in the initial VET fields of logistics and carpentry. For example, small-scale plastic shelves have been used with apprentice logisticians in the French-speaking part of Switzerland to teach

concepts about warehouse surfaces, letting them directly design the warehouse layout. The shelves could be detected by a software system that allows displaying more abstract information concerning, for example, the quantity of goods that can be stored in the warehouse and the flow of different kinds of goods. In this experience, the boundary characteristic of technology was implemented in the "opposite" way with respect to previous cases. In fact, class activities were used to go back to the workplace and find similarities and differences in the practice compared to the results obtained in class through the simulations. Such studies reported mixed evidence of the effectiveness of using TUIs on learning outcomes and usability (Cuendet, Jermann, & Dillenbourg, 2012; Do-Lenh, Jermann, Arn, Zufferey, & Dillenbourg, 2011; Do-Lenh, Jermann, Cuendet, Zufferey, & Dillenbourg, 2010).

This raises the question of whether the extent to which TUIs can improve learning is largely dependent on the instructional scenario and related to the teaching process rather than an inherent characteristic of this technology per se. As a consequence, five principles for the effective design of augmented reality environments were identified (Cuendet, Bonnard, Do-Lenh, & Dillenbourg, 2013). These principles are integration, empowerment, awareness, flexibility, and minimalism. Integration deals with the fact that TUIs cannot support all the classroom activities, but comprise one tool among others. These activities then have to be integrated as much as possible in the classroom flow. Empowerment focuses on the fact that, regardless of the TUI employed, the teacher should have the possibility to keep and guide the classroom interactions if needed, without letting the students be distracted by technology. Awareness concerns the fact that the teacher must be provided with a permanent picture of her students' status through aggregated data visualizations. The flexibility principle states that, depending on how the scenario develops, the learning environment has to be flexible enough to adapt what is foreseen to what is really happening in the classroom. Finally, according to the minimalism principle, the learning environment should not provide more information (and functionalities) than is needed in the specific activity.

Digital Simulations

Digital simulations are technology-based learning environments in which some part of reality is imitated. This could be a system, a phenomenon, or a process (De Jong & Van Joolingen, 1998). Within these environments, learners are required to fulfill complex tasks, which are more or less close to real-life tasks. Thus, simulations could be considered as a form of experiential learning with a high degree of authenticity, and they are sometimes also subsumed under the broader concept of "virtual realities" (Grau, 2003). As Breckwoldt, Gruber, and Wittmann (2014) underline,

> They are dynamic and change over time (whether the learner reacts or not), and the interplay of variables usually is complex and not

completely transparent (i.e. the learner has to understand side effects). First and foremost, however, they provide educational safety and illustrative clarity. [Digital] simulations can model situations that in reality are too dangerous to be used for learning (e.g., aviation, surgery, nuclear reactions), which are either too large or too small to be observed (e.g., seismotectonic processes, molecular processes), or cannot easily be repeated for didactical reasons (e.g., earthquakes, traffic accidents). (p. 674)

Given the fact that professional activities quite often require the handling of exactly these kinds of situations, digital simulations are widespread and have a long history in the context of vocational education. More specifically, their application spans tasks and domains as diverse as the initial and further training of pilots in flight simulators (Wong, Meyer, Timson, Perfect, & White, 2012), simulation of decision making in business education (Mayer, Dale, Fraccastoro, & Moss, 2011), and medical diagnosis using virtual patients (Consorti, Mancuso, Nocioni, & Piccolo, 2012). The popularity of digital simulations is mainly due to their characteristics as authentic, learner-centered instructional settings. In particular, they are expected to support domain-related knowledge construction and higher order cognitive skills; promote enjoyment, intrinsic motivation, and positive attitudes; and thus specifically foster self-efficacy and learning transfer (Mayer et al., 2011; Myers & Reigeluth, 2016). The supposed benefits of simulation-based learning are basically corroborated by results from empirical research (Sitzmann, 2011; Wouters, Nimwegen, Oostendorp, & van der Spek, 2013). However, the evidence from these studies also suggests that in order to unfold their full potential, digital simulations require two key prerequisites, notably high-quality simulation design and adequate instructional integration (i.e., learning arrangement design). With regard to the first key prerequisite, adequate guidance through the simulation world, high levels of user control and feedback provision after experiencing the simulation seem to be fundamental (Gegenfurtner, Quesada-Pallarès, & Knogler, 2014). Concerning the second prerequisite, instructional integration, it is particularly emphasized that the simulation experiences need to be complemented with adequate preparation, elaboration, practice, debriefing/reflection, and transfer of what has been learned during the game play (Leemkuil & de Jong, 2011). As demonstrated by a recent study in financial education with 89 students on pre-vocational orientation courses in Swiss German secondary schools (Aprea, Schultheis, & Stolle, 2018), a powerful instructional remedy for guiding these processes is the design of learning tasks, mainly because of their potential for connecting the simulation-based learning with the preceding and the following learning contexts. In this study, which applied a design-based research approach, students were given the opportunity to execute real financial decisions (e.g., budgeting, spending, and investigating) within a digital game world. However, executing the decisions within the game was not sufficient, as reflection and transfer tasks seemed to be very important to enable students to progress in their learning in terms of

acquisition of conceptual knowledge and reasoning skills, as measured by pretest–posttest comparisons. Similar to the aforementioned experiences with TUIs, this again underlines the importance of integrating technology into a sound instructional scenario.

Research and Future Directions for TELEs in VET

In this final section, we share some reflections on what has been learned so far with regard to TELEs in VET and discuss directions for future research. More specifically, we outline three aspects. First, the results of our own studies as well as those of others clearly demonstrate the effectiveness of TELEs in VET. As the empirical evidence collected so far indicates, TELEs seem to be specifically useful for bridging the gap between different learning sites such as schools and workplaces, and to support learning, teaching, and communication across these sites. However, one should be aware that the available studies are mostly based on small sample sizes, usually with volunteer teachers, trainers, and students. Thus, a potential objection could be that their typically positive results might be, at least in part, due to self-selection effects of particularly motivated or otherwise specific participants. To control for this effect, more representative studies at a larger scale should be conducted. Moreover, to assure that the results do not depend only on some kind of novelty effect, it would also be important to investigate the long-term impact of TELEs by running longitudinal studies (Grammer, Coffman, Ornstein, & Morrison, 2013; St. Clair, 2004).

The second issue is related to the first and concerns the conditions for effective design and implementation of TELEs in VET. Regarding this aspect, we experienced that the early inclusion of all relevant partners seems to be pivotal for the acceptance of TELEs in VET. However, more systematic research is needed to determine relevant prerequisites of their successful design and implementation. Following the comprehensive stance of the connectivity and boundary-crossing approach (Sappa & Aprea, 2014; Tynjälä, 2009), future studies in this regard should include different levels of VET. For example, at the level of concrete learning and teaching processes, the prior knowledge, interest, and attitudes of VET students, teachers, and trainers might be considered. At the institutional level, the type, structure, and frequency of communication between the various learning sites as well as the accessibility of the required technological equipment would presumably be of interest; whereas at the system level, how the alternation between the learning sites is regulated is expected to play an important role.

Finally, it is important to highlight the need to train VET teachers and trainers with respect to the adequate design and implementation of TELEs. A possible approach in this regard could be the T-PACK framework by Mishra and colleagues (Harris, Mishra, & Koehler, 2009; Mishra & Koehler, 2006), which uses Shulman's (1986) typology of teacher knowledge to conceptualize relevant contents of respective training interventions. In addition, a model that specifies how to use teachers' experience in order to support their professional development

has been proposed by Riis, Allermand, Brodersen, and Rasmussen (2017). We would welcome future studies to investigate whether and how technologies could be used to support an inclusive, diversified, and participatory educational approach as well as a fair distribution of learning chances in VET and beyond.

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20

VET as Lifelong Learning: Engagement With Distributed Knowledge in Software Engineering

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Introduction

Continuous learning and development are critical for the quality of professional services as well as for the opportunities for individuals to take part in a working life characterized by rapid shifts in knowledge and institutional arrangements. In this context, vocational education and training (VET) should be understood in a longer time span and as involving processes that encompass educational and work-related activities. These activities may assume shifting roles in practitioners' learning throughout their careers, and individuals may gravitate in and out of education and work contexts in their efforts to update skills and become more proficient in specialized work practices.

Although this is generally acknowledged, the relationship between formal training and work-based learning continues to be a troublesome issue. When addressing initial and continuous education, VET policies in many countries place emphasis on formal education and training. Such policies claim that activities should follow the standards for education and training in a given area of work and ought to be provided in line with relevant qualification frameworks (Young, 2011). Responding to these expectations, a range of courses, manuals, and online resources are provided to assist practitioners in meeting formal requirements for continuing development, often monitored by professional bodies and work organizations (Reich, Rooney, & Boud, 2015). As a consequence, models for VET, as well as for continuing professional development, seem to prioritize organized learning that engages with predetermined knowledge (Fenwick, 2009). In these models, following the rather conventional conceptions of VET, the contribution of everyday work-based learning seems to be still largely overlooked. At the same time, the responsibility for staying updated and developing expertise over time is seen in an individual context. In a professional life

characterized by increased specialization and division of labor, caring about one's own experience and career opportunities becomes more important. Moreover, individuals are often held accountable for the quality of work and services they provide to clients and user groups, and in many fields, they also face responsibility for ensuring that professional actions are based on relevant and updated knowledge (Nerland & Jensen, 2007). Against the backdrop of these extended and partly individualized responsibilities, it is a paradox that self-initiated learning and knowledge construction are rarely recognized as key VET elements.

In this chapter, we understand the concept of *self-initiated learning* as a general term denoting individuals' ways of deliberately searching learning opportunities or exploring knowledge beyond what is needed for immediate instrumental use. We argue that professional learning, both in educational settings and in working life, is not only about participating in preset programs or meeting formal requirements, but rather about deliberate practices of self-conduct in which professionals engage in improving practice and exploring knowledge on a discretionary basis. Assuming such responsibilities and adopting a learning mindset as a way of life are proposed as a new definition of professionalism. As stated by Simons and Ruijters (2014), "The question is no longer who is a professional, but who chooses to be a professional. And by implication, if you choose to be a professional—how do you shape your professional development in order to remain a professional" (p. 981). These more self-organized dimensions of professional learning thus need to be further explored. Moreover, as habitual ways of accessing and exploring knowledge seem to be learned during initial professional education and continue into working life (Smeby, 2012), we need a better understanding of how the capacity for self-initiated learning can be nurtured in professional education and VET and further encouraged in work situations. It is thus interesting to look into the practices of students and professional practitioners alike.

To explore these issues further, it is necessary to address how the knowledge domain and its sociomaterial environment provide practitioners with resources for learning and professional development. Individuals do not become professionals in a vacuum. Rather, they develop understanding and learn to navigate in their specific epistemic environment by taking part in professional practices. Thus, the ways of structuring and organizing knowledge in the professional field are significant for learning and identity formation (Nerland, 2008). The types of knowledge resources available and the practices through which knowledge is generated and shared provide distinct resources through which practitioners negotiate their competencies and form their professional lives (Jensen, Lahn, & Nerland, 2012; see also Chapter 19, this volume).

In this chapter, we use the field of software engineering as a case to explore and discuss how students and early-career practitioners pursue knowledge and construct learning opportunities for themselves by approaching and utilizing distributed knowledge resources. Software engineering is an appropriate case for several reasons. First, this professional domain is characterized by a plenitude of versatile and web-based knowledge resources, which are widely distributed and

accessible from various geographical locations (Mackenzie, 2005). Second, the demands for continuous learning are high, as professional ways of knowing are tightly related to advances in technological developments, standards, and modes of problem solving (Nerland, 2008). Keeping up with developments in the domain is typically through engagement with new, distributed knowledge resources. Third, such resources are used not only by professional programmers but also by students in software engineering education (Damşa & Nerland, 2016). Engaging students in "authentic" projects is increasingly emphasized in engineering education, as it provides opportunities for them to learn how to work with complex problems by adapting and integrating various knowledge forms (Litzinger, Lattuca, Hadgraft, & Newstetter, 2011). Moreover, such projects are believed to provide students with concrete images of "real" engineering work as resources for learning (Stevens, Johri, & O'Connor, 2014). Therefore, there are features of the educational curriculum that explicitly attempt to mirror professional practices in educational contexts, which, in the longer term, may facilitate learners' capacity to pursue learning opportunities at work and care for their own professional development (Jollands, Jolly, & Molyneaux, 2012).

For these reasons, we find software engineering appropriate for illustrating how learners at different stages of their professional lives explore and capitalize on knowledge resources to pursue learning opportunities. We draw on data from two research projects: one on software engineering students' learning while working on "authentic" projects, and one on novice engineers' continuous learning at work. In both contexts, we explore (a) how learners access distributed knowledge resources as they work on developing software engineering projects; (b) how engagement with these resources leads to further inquiries and knowledge construction; and (c) the deliberate manner in which distributed knowledge resources are used by participants to set up and pursue learning opportunities for themselves.

The chapter is organized as follows. We begin by presenting a theoretical perspective on epistemic practices and object relations in professional learning, which provides analytical concepts for examining how knowledge is explored and circulated in deliberate ways in everyday work. We then briefly introduce the empirical cases, which serve as a basis for the discussion, before we illustrate and discuss how software engineering students and professionals alike become involved in learning through their ways of engaging with distributed knowledge resources. We conclude by discussing opportunities and challenges for learning within this area of expertise, and suggest that models for continuous professional development should be reconsidered to recognize the role that self-initiated learning plays in these resource-rich environments.

Epistemic Practices and Objects in Professional Learning

Research on work-based professional and vocational learning has been conducted, to a large extent, within sociocultural strands of learning theory (Billett, Smith, & Barker, 2005; Lahn, 2011). A key theoretical assumption characteristic

of this perspective is that learning happens as individuals participate in, identify with, and are gradually able to assume more central roles in social practices. Moreover, participation is manifested as a set of actions mediated by cultural tools of semiotic and/or material kinds, which are the products of the development of practices over time (Säljö, 2010). By relating to cultural tools, individuals thus gain access to collective knowledge and, at the same time, to instruments aimed at invoking and adapting such knowledge for the purposes of the situation at hand (Guile, 2010). As tools are changing and becoming more complex, the demands for learning are also changing. Learning how to approach and use new tools becomes a learning challenge in itself. Moreover, in the wake of the digitization of work, new ways of representing knowledge and retrieving information present a stronger epistemic dimension to professional practice. This requires analytical and reorganizing capacities (Säljö, 2010) as well as agency from the learner in order to select, reorganize, and adapt knowledge and information in contexts of local problem solving (Damşa, 2014).

To further specify the epistemic dimensions of practice-based learning, the more established perspectives on learning as changing participation in social practices have been extended in recent years with concepts and analytical lenses from the social study of science (Lahn, 2011; Markauskaite & Goodyear, 2016; Nerland & Jensen, 2014). This literature takes specific interest in the practices through which knowledge is generated, assessed, and used in distinct ways in different fields of expertise and in the role of material representations in this regard. Moreover, while acknowledging the situated nature of actions and learning, there is a stronger emphasis on how knowledge circulates and advances over temporal scales and across knowledge settings in expert cultures as well as how this wider dynamic influences the local enactment of practice and provides resources for learning (Jensen, Nerland, & Enqvist-Jensen, 2015; Knorr Cetina, 2007).

The manner in which knowledge is inscribed in various types of artifacts and distributed across contexts in the professional domain is key to knowledge circulation. In professional work, we often find a range of knowledge resources that potentially take on different functions in activity and that can be used, adapted, and combined in multiple ways. In Wartofsky's terms (1979), we see a range of secondary and tertiary artifacts that may allow for tinkering and engagement in future-oriented scenarios among the participants who approach them. At the same time, manifold hands-on resources such as templates and procedures are circulated. The distinction between tools that are "ready-to-use" and tools that become "objects-of-further-exploration" becomes more blurred, and this potential can often arise simultaneously (Knorr Cetina, 2006). For instance, a piece of programming code may be used at face value to solve a technical problem, but it may also be subjected to analysis and refinement. In fact, as proposed by Engeström (1990), the capacity of artifacts to serve different functions in activity may be a prerequisite for their influential power on human practices. Thus, rather than understanding materialized knowledge as one determined type of tool, we should attend to its open-ended potential when interpreted, adapted, and combined for specific purposes. This also means that

ways of knowing in practice are emergent and realized in conjunction with practitioners' ways of exercising agency (Damşa et al., 2017).

A helpful concept to understand and explore knowledge construction that evolves around knowledge resources of various kinds is *epistemic objects.* Expert communities are typically object-centered in the sense that they are oriented toward exploring, developing, and mobilizing knowledge objects (Knorr Cetina, 2001). Such objects are, however, not understood as separate material things. Rather, they may be described as complex amalgams of material and symbolic resources that constitute knowledge around a problem and, through their inherent complexity, activate a set of opportunities when they are approached (Nerland & Jensen, 2014). Moreover, following Knorr Cetina's (2001) definition, epistemic objects are characterized by their unfolding and question-generating character. As she explains, "Since epistemic objects are always in the process of being materially defined, they continually acquire new properties and change the ones they have" (Knorr Cetina, 2001, p. 181). In the context of professional learning, examples of epistemic objects could be models for medical treatment and complex representations of financial markets. They are created in expert cultures and further developed as people in different settings attend to them, explore their complexity, and materialize their potential in local activities. Computer programs are another example of objects that propel such dynamics by their way of simultaneously being ready for use and in a process of transformation (Knorr Cetina, 2001; Mackenzie, 2005). This dynamism brings a creative-constructive dimension to work, which may serve as a driving force for continuous learning (Jensen, 2007).

Although the concept of epistemic objects is appropriate for exploring how various resources and instantiations of a problem are assembled to make up objects of inquiry, the concept of *epistemic practices* is useful in examining how participants explore and construct knowledge in relation to their objects. Epistemic practices denote the specific ways in which knowledge is approached, developed, and shared in a given area of expertise (Knorr Cetina, 2007). This involves the collective practices for generating or examining knowledge or for finding solutions to problems (Kelly, 2011). These practices become enacted as participants propose, justify, evaluate, and legitimize knowledge claims. Epistemic practices embody the methodological principles and ways of working that are distinctive to the expert culture and are thus fundamental for the procedural side of professional expertise. In the engineering domain, such practices are proposed to include approaches to problem definition and problem solving, ways of applying propositional knowledge (e.g., math and science) to problem solving, construction of models and prototypes, and ways of envisioning and assessing multiple solutions (Cunningham & Kelly, 2017). For newcomers to the profession, they form a critical part of what needs to be learned in order to develop as a prospective professional. For early-career practitioners, continuous learning is often related to taking up new practices and ways of working or to the specialization of a repertoire of practices in relation to more advanced tasks.

Epistemic practices are significant for participants' engagement with distributed knowledge resources. Different knowledge forms and representations require different practices to be opened up for scrutiny or use. Hence, epistemic

practices play a critical role in making knowledge "actionable" in specific contexts (Markauskaite & Goodyear, 2016). Such practices are critical for the construction of meaning as they are the means through which connections are made, knowledge and meaning are translated, and representations of a given object are produced and maintained in professional work.

From this perspective, professional learning can be seen as evolving along epistemic trajectories that are constructed in interplay between knowledge resources and practices in a given domain and in the active exploration of the learner (Lahn, 2011). Moreover, learning requires engagement of the self in the form of identification and navigation through which participants actively assemble and shape their local epistemic environment (Markauskaite & Goodyear, 2016; Stevens, O'Connor, Garrison, Jocuns, & Amos, 2008). This requires epistemic agency and deliberate ways of engaging with knowledge resources for the purpose of learning (Damşa, 2014; Damşa et al., 2017). By attending to how knowledge resources are accessed, explored, and used in performing professional activities, as well as how practitioners make deliberate use of such resources in forming their learning trajectories, we may develop a better understanding of how participation in work-related practices contributes to VET and to practitioners' continuous professional development.

Software Engineers Learning With Distributed Knowledge: Case Studies in Higher Education and Work

We now draw on findings from two research projects (for more details, see Damşa & Nerland, 2016). The first was part of the Quality of Norwegian Higher Education (2014–2017) study, and the second was part of the Professional Learning in a Changing Society study (ProLearn, 2004–2008). The first project, in the context of higher education, followed groups of first-year undergraduate engineering students as they conducted software development projects in two course contexts.[1] The first course was Introduction to Web Development, in which groups of four students each were required to design and develop functional websites. We followed four of these groups. The emphasis was on both identifying the appropriate design and developing the technical elements of a website by using various programming languages, together with managing the project activities. The second course was Program Development, in which Java programing skills were emphasized. We followed five groups of four students each in their project work aimed at developing a board game, which required knowledge of software programming languages, documentation of the programming process, and coordination of the collaborative project work. In both cases, students attended lectures and laboratory sessions, and received feedback from teaching assistants. Data comprised videotaped observations of group meetings, files from the groups' programming activity, documentation of knowledge resources utilized, and group interviews at the end of the project period. The interviews documented the students' experiences with the project task, domain knowledge, ways of accessing and working with resources, and challenges encountered during their project work.

The second project focused on the learning opportunities and practices of early-career engineers who had graduated from the same undergraduate program described here (Some materials and findings from this project were previously reported in Nerland (2008, 2010)). Ten engineers were followed in their work practices over 2 + 2 weeks during their first year as professionals. This was done by means of weekly learning logs, individual interviews, and a focus group interview. The participants were then re-interviewed in 2009, as a follow-up study of the ProLearn project. The learning logs registered problems and learning challenges experienced at work, the types of knowledge resources accessed to handle these problems and challenges, and the solutions or questions they generated. The interviews focused on work practices and how the participants went about learning and further developing their professional expertise. The focus group interview was designed to discuss characteristics of computer engineering as an epistemic field.

All interviews and selected episodes from the observations were transcribed verbatim and analyzed together with the logs and document data using programs for qualitative data analysis. The studies employed a shared analytical strategy. First, we traced the types of knowledge resources utilized in the activity through a thematic analysis. We then followed processes emerging from engagement with these resources and how these activities stimulated further explorations of epistemic objects. Third, the interview data were used to identify and analyze strategic efforts at creating and monitoring learning opportunities over time.

In the following sections of this chapter, we use this research to reveal how self-initiated learning with distributed knowledge resources is embedded in the everyday activities of studying and working alike, although with some differences in the temporal and spatial scales of the activities. More specifically, we illustrate how participants in the two contexts became involved in object-related learning and how they used resources in deliberate ways to monitor and create learning opportunities.

Engineering Students' Learning

"An Endless Universe"—Students' View of the Knowledge Domain Resources

Generally, curricula in professional higher education are well structured, with clear aims, activities, and resources to be accessed. Analysis of documents and observations of the courses we followed in this software engineering program confirmed this, with the students being presented with sets of skills and knowledge (in the form of learning outcomes and assessment criteria) deemed important from a professional domain perspective. Through the syllabus, lectures, and supervision meetings, the students were informed about the resources available both within and outside the curriculum. Software engineering is a domain characterized by geographically dispersed knowledge and often represented in online resources; hence, study programs are faced with the challenge of keeping up with the dynamic and wide-scale knowledge culture (Litzinger

et al., 2011). By presenting the students with the alternative of finding knowledge needed to learn programming skills, the program and teachers meet the students' needs somewhat halfway.

The students have the choice to engage with material beyond the course, as this comment from a group interview with program development students shows:

> We had this list of things we had to do, and a list of documentation sources, which were optional. It was up to us to use them or not, but if you wanted to have a cool game you kinda had to use them. *(Laughing.)*

As this comment indicates, the students quickly understood that the regular curriculum will support their learning of the basic programming skills, but that more advanced work could be done through engaging with additional sources. Some of the groups pursued this endeavor; hence, we see learning behavior that indicates variation in the way students choose to engage with the resources available. This excerpt from an interview, with students on the web development course, displays a group's reflection at the end of the project period on affordances and challenges brought about by the access to widely available resources.

S1:   … Yeah, the teachers give us really basic starting points on how to do basic things and tools, cause they say this as well: "Look it up, look it up!"

Int: You wouldn't expect it from the teacher to tell you what to do?

S2:   The teachers are kinda, in my opinion … they are not teaching us *how* to do it, they are teaching us where to go, showing us the way.…

S3:   And it is extremely challenging in the beginning if you're not used to these resources you get on your lap. Cause it's baffling the size of it, it's like this endless universe, but also a giant world of opportunities.… And it's like, "Here, go out, sort out all this knowledge, make something out of it." But we know these are skills we need to learn, and there isn't really another way to learn it.…

The students seem to be well aware that the programming and development skills can be developed through a combination of the regular program offer (i.e., the syllabus and teacher's guidance, but not necessarily close training) and the informal knowledge structures provided by the professional knowledge domain. In other words, they understand that to become professional developers, they must be oriented toward such global and distributed information structures (Jensen et al., 2012), despite the challenges associated with this more forward-looking ambition to learn. Another interesting aspect to be noted is the status and function of these resources. At the start of the process, the students are focusing on accessing and deciphering the world of resources to identify what and how these can inform or serve their programming efforts. They also appear to be quite aware (in an agentic fashion) of the necessity of this exercise and engage deliberately in pursuing these resources further (Damşa, 2014), not as objects of exploration, but as assets that support problem solving and object development (Nerland, 2008).

Assembling, Understanding, and Using Resources for Further Exploration

The student groups' project work was characterized by constant boundary crossing from onsite learning contexts (e.g., organized course activities and face-to-face group meetings) into the online environments where professional knowledge resources are easily available. Knowledge and resources identified as instrumental were pursued usually collaboratively, especially when the complexity of the task, combined with the novelty of the resources involved, generated challenges for the programming and development work. The students devised strategies to address such challenges, as we can see in the next excerpt, where they discuss a problem encountered in programming a body mass index (BMI) calculator for their website. The discussion focuses on knowledge and tools identified from professional sources (e.g., api.jQuery and GET) and the problems generated by trying to engage with these: first, inexperience with engaging these resources; and, second, the need to understand how these can be employed for the purpose of developing the website applications.

S1: We have such a calculator made in JavaScript, right? *(Shows calculator made with JavaScript.)*

S2: Yes.

S1: And then I do not think we … we would have needed to call that jQuery which … a forward-loop. *(Switches to programming window.)*

S2: Yes, what you, what you can do to avoid that problem … *(S1 scrolls down)* is either to write in JavaScript or use Ajax.

S1: But we are unable to call JavaScript, ehm … the jQuery.…

S2: If you go to the http://api.jquery.com.

S1: API jQuery? *(Inserts search term in Google browser, clicks on hyperlink.)*

S2: Ehm … yes… ehmm … and then, yes, either POST *or* GET.…

S1: Try with GET then. *(Inserts search term, scrolls down.) …* Ehmm … that one, maybe?

S2: Yeah … let's see. *(S1 scrolls through the hits.)* I don't remember exactly, but it should be an Ajax category, maybe.…

S3: … Submit without reloading or something …

S1: … I think we'll choose a simple for-loop to reach the goal *(Scrolls down on the page)* and approach it that way.

As the software product increases in complexity, the students do not rely on the course resources any longer. They have accessed various other online resources, which offered them additional insights, tools, and opportunities to solve problems encountered in the programing process. The accessed resources are meant to support solving the problem and furthering the work. But, before arriving at the point where resources are being instrumental for the programming process, the students are challenged to address the multitude of alternative solutions, with the novelty of the knowledge embedded in the accessed resources, and the lack of structured guidance in how to engage with these. As this group discussion shows, the students devise strategies for how to alleviate lack of understanding about both how to access resources and how these

resources can be employed in their programming work. By capitalizing on one of the group member's more extensive experience with such resources, the group finds its way toward using these in a targeted way, which brings them closer to generating a solution. Although this discussion only provides a glimpse into the students' extended work with these resources, it is noticeable how the engagement shifts focus from making sense of the nature and type of the accessed resources—in other words, exploring them as unknown, epistemic objects (Knorr Cetina, 2001)—toward using these as tools for pursuing further the exploration and elaboration of the software product. We observe here a versatile approach by the students, in which they move fast between levels of complexity and engage with resources and each other in a way that facilitates both their understanding of the domain and the concrete advancement of the epistemic object they are shaping.

Deliberate Engagement With Resources Beyond the Course Boundaries— "Someone Out There Is Working on the Same Problem"

Although some of the student groups we followed engaged with resources beyond the course curriculum and connected to various professional crowd-sourced platforms, the question arises as to whether these distributed knowledge resources are used deliberately by participants to pursue programming work. These excerpts from two group interviews (the first from the web development course and the second from the program development course) shed some light on this aspect.

Int: What other sources did you use? You mentioned searching online, Google?
S1: Stack Overflow, the community we spoke about, and W3Schools, which explains HTML and CSS.
Int: So these are expert forums, or platforms?
S1: Yeah, and the W3Schools is very good for, uhm....
S2: Very easy explaining, very basic stuff, tool by tool, you can go to a specific tool and they share examples, they have, like, tryouts, you can try write some code by yourself....
S3: ... With Stack Overflow you can just write it, if you have a problem, you can just write in standard text, and you will probably find something, someone with the same problem, providing ideas....
Int: ... Why did you use online resources?
S4: Because these are the most updated ones. Because programming and stuff changes, and the books are getting outdated.

As revealed by these interview statements, the students targeted professional resources (generated by professional programmers) strategically. They could easily indicate the benefits related to using these resources: They are always up-to-date, and that is important in a field where technologies and knowledge are changing rapidly; they were created by professionals, aware of the problems a developer can encounter when facing a problem; they provided various alternatives, with the best one being usually validated by the expert community; and they were easily accessible, free, and flexible. Their use of resources can be

characterized as relying on the extended software programming community expertise, in which knowledge and solutions provided by the professional developers permeate at all levels and through all media. As explained, this implies quick access to reliable, tested, and validated knowledge and procedures, which speeds up their learning process. The way the students discuss, work with, and reflect on the use of resources and their function shows that, despite the challenges generated by inexperience and by lack of knowledge and guiding structures, they display and pursue deliberate choices in order to generate learning opportunities for themselves. Furthermore, the data also disclose that the students' engagement with the (professional) resources and domain is not perceived as an incidental encounter, but rather as part of a sustained, agentic effort (Damşa, 2014) to develop and advance their knowledge and skills in the same way professionals do. In this regard, the students move in a temporal dimension when relating to the distributed and professional resources, thus embarking on a longer learning trajectory that will continue beyond their formal education boundaries.

Early-Career Engineers' Learning

Accessing Distributed Knowledge in Everyday Work: Targeted Searches on the Internet

Contrary to what we have seen in the examples from engineering education, the early-career engineers seem sufficiently embedded in their knowledge domain to identify the types of challenges they face and to know how to direct their inquiries in ways that might lead to answers. This makes it possible to access knowledge resources in a more targeted way. At the same time, their way of accessing and using the resources has many similarities with the students' practices. In their everyday problem solving, the engineers often face practical problems and turn to Internet searches for solutions. A common resource type is forums or chats among practitioners in the domain. Technologies shift rapidly in this field, and since the time of the data collection, IRC has witnessed a decline as users have moved to other social media platforms like Facebook and Twitter. However the IRC network Freenode is still powerful, with around 90,000 users. For more information, see https://freenode.net/. As one engineer explained in an interview:

> You find new knowledge on different websites where people have had the same problem as you before and where many have posted their solutions. I often look at the IRC chat program—the people who hang out there know their stuff. It doesn't take long before you get an answer.

This way of searching for and identifying knowledge resources is typical among software engineers, who have previously been characterized as "hunter-gatherers of knowledge and resources" (Eraut, Kaillardet, Miller, & Furner, 2004). Quite often, as we also found in our study, this form of inquiry derives

from a very specific, practical problem. To be able to identify helpful resources, however, engineers must be able to classify and name the problem. This happens by way of a specific professional terminology. One example comes from the learning log of one engineer in the second period of log filling (reported information in *italics*):

1) Knowledge-related questions and challenges you have faced during work today:
   Programming: How to read a text string to an XML tree (DOM)?
   Database: How to change the name of a column in a readymade table?
   Subversion controlling system: How to dissolve a situation with failure messages when something is to be uploaded?
2) What was the trigger for your questioning/inquisitiveness?
   Practical problems
3) Knowledge resources you have accessed to deal with your question:
   Google led me to discussion groups/forums, which provided the answers. Colleagues have also assisted me.

In these examples, we see how these engineers enter a Q&A structure that is socially mediated by other participants in the same setting, synchronously or asynchronously. However, it is not given that the answer follows the question as in a regular conversation. It may equally happen the other way around: A practitioner enters his or her question in a search field, and identifies previous posts from other participants who have discussed the same issue. Such resources may thus take the form of information repositories, which also make up an infrastructure that guides practitioners' explorations through the ways in which questions, answers, and themes are linked.

The examples shown here illustrate how the engineers engage with resources that embody knowledge in a variety of representational forms and comprise technical specifications, standardized methods of inquiry in relation to technological devices, and "best practices" circulated in the community. This sharing is made possible through a high degree of codification as well as through agreed-upon standards of good work. Standards make it possible to inscribe and distribute knowledge in various types of artifacts, which can be accessed by individual practitioners in contexts that do not require interaction with others. One engineer described how he frequently accessed knowledge bases, FAQs (frequently asked questions), and user manuals when he experienced practical problems in his programming work. Moreover, he accessed examples of authoritative programming codes written by others to assure the standards of his own work. As he explained, "I often use existing source codes as an example to ensure that I follow standard implementation. This will also make the maintenance of the source code easier and contribute to developing a homogenous and standardized code." As work is often characterized by a high division of labor and specialized tasks, problem identification and targeted searches are enhanced by the organization of work (Nerland, 2008). The epistemic practices involved in these examples concern problem identification and framing and, in the next step, exploration and adaptation of the resources to the problem at hand. Rather than forming an epistemic object, the resources are often used in a technical way for the purpose

of instantaneous problem solving. However, we also observed situations in which the technical use generated new questions and led to further exploration and construction of epistemic objects. The next example illustrates how methodological principles for organizing project work can be turned into objects of exploration.

Learning by Exploring Epistemic Objects: The Example of Agile Methods

Continuous professional development can be seen as a matter of exploring and appropriating new tools and practices in the context of everyday work. One change driver in software development during the last decade has been the introduction and spread of so-called *agile methods*. This can be described as a shift toward "test-driven development," which implies new procedures and ways of organizing engineering projects (Dybå and Dingsøyr, 2008). A key principle is that software development projects are broken down into shorter cycles in which the testing of functions is integrated on a regular basis rather than placed at the end phase of the project. This also implies a more central role given to the customer or user in the development process, as alignment with users constitutes an aspect of regular testing. One engineer described how this alters the very purpose of testing in the development process:

> We work in cycles of two weeks and deliver working codes at the end of each period … which the customer can make use of. Testing is integrated in these cycles. This means that … we no longer test to identify failures as we used to; rather, we perform tests to *avoid* failure.

Seen through the lenses of epistemic practices and object relations, testing products with customers becomes a main epistemic practice to secure work quality. At the same time, this practice is tightly related to the processes of developing new functionalities and documenting work. Thus, the process evolves around temporary technological solutions, which are alternately subjected to testing, further exploration, and refinement. Moreover, although engineering work still comprises specialized tasks, the development process takes a collaborative form, relying on continuous sharing of knowledge among team members as well as between developers and users. In turn, the very acts of communication become key to handling adaptation and demands for change in the ongoing construction and materialization of knowledge objects, which are shared in the community of software developers and their customers. One engineer said, "The existing is continuously driven forward," pointing to a change dynamism that emerges from the way the product in the making is in continuing development through the ways in which different actors interact with it and with each other. In this process, the engineers also attend to different scales of time, as they simultaneously engage in future project planning and present problem solving.

This example illustrates how agile software development is realized through the enactment of a set of epistemic practices evolving around an unfolding object, which, in its different versions and through the contributions from

various actors, is on its way to becoming materialized. Here, the product under development forms a shared epistemic object. In addition, the methodological principles of agile development could turn into epistemic objects themselves. The approach implies shifts in ways of organizing work, and breaking with the previous plan-driven forms of project work may require explicit attention to the work process as an object of inquiry. One engineer described the challenge in terms of "molting," in which his team needed to explore the meanings of the agile principles as such, as well as to materialize these principles in their work context. In this process, they engaged, for instance, in creating new platforms for knowledge sharing, in experimenting with new forms of collaboration, and in developing shared routines for integrating testing in the development process (see also Nerland & Jensen, 2014). Another engineer even described how his firm hired an American professor with expertise in agile development to work part-time and to contribute research-based knowledge to the processes of (re)organizing work. By doing so, the set of available knowledge resources in this work context was expanded to recent international research at the same time as knowledge was mediated and shared by way of personal interaction.

From a wider perspective, these examples illustrate how the principles of agile development are circulated in the global community of software developers and adopted, embraced, and further developed in local work settings. Although the primary purpose of these activities is to perform work, they certainly generate learning through the way in which practice and knowledge are expanded and through the deliberate efforts to move between exploring basic principles of agile methods and how they can be employed in specific project settings. It is also striking how work in these examples is a collaborative achievement, which relies on social interaction around shared epistemic objects. This also requires agency from the participants—not only on an individual basis, but also in the form of shared epistemic agency that enables deliberate, collaborative knowledge construction (Damșa, 2014).

Managing Learning Opportunities Over Time by Monitoring Technological Advancements

As discussed in this chapter, monitoring and engaging oneself in technological advancements are regarded as individual responsibilities in the work careers of software engineers. However, as workdays are often dominated by sequences of instant problem solving (Nerland, 2008), early-career engineers need to activate other techniques to keep up with advancements more broadly and to secure their long-term career interests. A major strategy in this regard is related to monitoring advancements in the technological field. When practitioners come in contact with new knowledge as part of their problem-solving activities, they simultaneously employ techniques aimed at staying informed of what is happening. One engineer described it like this:

> It is extremely important to … have an idea of what's happening. So you keep an eye on it, but you don't really go into it. Perhaps you try it out for

> 10 minutes or so, just to see what it is, and then you put it aside. But then I know that the next time I face this kind of question, I will have a closer look at it.

This kind of self-management involves directing one's attention toward possible future scenarios and actively engaging oneself in such scenarios.

Another way of deliberately seeking to remain abreast is to express interest in participation in new projects that involve opportunities for learning about new technologies. Although such participation may have an optional character, especially in larger companies, the engineers seemed eager to use these opportunities to develop their competence. The positioning occasionally involves groundwork and self-regulation in terms of calculation, as expressed by this engineer: "You need to do some work behind the scenes in order to gain access to the right projects and to lead your career in the direction you would like it to take … and of course your competence development." This example also indicates potential challenges inherent in the project organization of work, as practitioners need to be devoted to the collaborative work of a team and, at the same time, manage their individual position in current and future settings (Guile & Lahiff, 2016; O'Riain, 2000).

These examples illustrate how opportunities for learning at work are, in part, individualized and related to career management. However, in line with the more collective way of thinking that emerges through the use of, say, agile methodologies, firms and project groups may take a more collective approach. Especially in relation to smaller firms, we found examples of organizational arrangements developed for the purpose of monitoring and trying out new technologies. One engineer, who at the time of the second interview had advanced to a partner position in a small firm, explained how the engineers in this firm were provided with some work hours devoted to studying new technologies, the information from which was then to be presented to colleagues in regular meetings called Presentation Zero. The aim was to share ideas, to explore the types of opportunities inherent to new technologies at an early stage, and for the firm to capitalize on these insights to be one step ahead of competitors. As he explained, "These presentations often generate many discussions and forms of engagement. Over time, it may lead to new products and solutions that can be commercialized. At present, the presentations serve as tools for knowledge sharing and joint knowledge development." In this way, monitoring technological advancements is systematized as a collective responsibility. Still, the basis for monitoring and sharing activities is versatile knowledge resources and information, which are distributed in the wider community of software developers.

These examples illustrate how individuals and communities alike monitor new technologies as well as explore their yet-unfulfilled potentials along multiple timescales. Learning is related to the deliberate exploration of these objects and opportunities in the work context, as well as the way in which versatile resources are adapted and further developed for local use. The character of the resources as such, being both ready at hand and open for further development, is an important prerequisite for such processes to unfold. However, to be productive in a longer process of learning and professional development,

the engineers must also deliberately mobilize knowledge resources to support future learning and career management. This requires agency along multiple timescales (Damşa et al., 2017), to align more immediate needs with long-term interests in productive ways.

Conclusion

We started this chapter by discussing how conventional conceptions of VET tend to emphasize formal education and training, and, as a consequence, overlook to an extent the contributions of learning as a self-initiated process, embedded in everyday work practices and involving knowledge construction. From this stance, we probed how engagement with versatile knowledge resources provides participants with opportunities for self-initiated learning in education and work contexts. Software engineering was used as an empirical context due to the character of knowledge resources in this domain, which are often web-based and versatile, and have the dual quality of being simultaneously ready-to-use and in-a-process-of-transformation. By considering empirical studies conducted in engineering education and work contexts, respectively, we focused on (a) how learners access distributed knowledge resources as they work on developing engineering projects, (b) how engagement with these resources leads to further inquiries and knowledge construction, and (c) the deliberate use of distributed knowledge resources by participants to set up and pursue learning opportunities for themselves. Learning was then seen as emerging in engineering practice at the intersection of available knowledge resources in the domain, the epistemic objects worked on by the participants, and the agentic capacity of participants to identify, explore, and make use of knowledge resources in shorter and longer time frames.

Our examples have demonstrated how students and professionals alike developed strategies to engage with knowledge resources that were available online and in distributed professional communities, such as programming patterns, explanations, validation tools, and procedures, in deliberate ways. These knowledge resources assumed different functions in the project work, being sometimes the object toward which explorations were directed and sometimes serving as tools for solving other tasks or problems in project development. This dual role of knowledge resources as epistemic objects and mediating tools allowed participants to arrive at solutions that were necessary to continue the project development, while simultaneously opening up new avenues for inquiry. The examples also demonstrated how participants exercised agency to access the resources and identify their potential for use in their current phases of project development as well as in constructing future learning opportunities.

Although the approaches taken by the students and early-career professionals shared many characteristics, we also observed some differences in how they engaged with the knowledge resources. One issue concerns variation in the thoroughness with which the participants explored the resources. Although the early-career professionals seemed to deliberately manage their learning efforts and distinguish between tools and situations that called for thorough explorations and

for situations that could be solved more instrumentally, the students were not sufficiently familiar with the epistemic environment, which made it more difficult to navigate proficiently and strategically. For instance, the students tended to start searching for various resources online without knowing what they were looking for or what problem they had to address, which led to more extended problem-framing periods and sometimes productive but unfocused explorations. Similar differences were found in research on professional development among experts and novices (Simons & Ruijters, 2014). We argue that such differences need to be understood in relation to mastering the epistemic practices necessary for accessing and utilizing knowledge resources in productive ways, and not solely as a matter of different levels of understanding. At the same time, versatile resources are challenging to make sense of, and the absence of immediate guidance for the engineering students in their project development may explain some of these differences. An additional learning challenge in this educational environment, but potentially also a very productive one, was that students had to construct their own material support structure and create an epistemic environment for their project work (Markauskaite & Goodyear, 2016). On the one hand, this type of (implied) task positions students in an ambiguous landscape with no clear routes to follow. On the other hand, this openness allows students to practice self-initiated learning and knowledge construction, and hence develop capacities as "learning professionals." Research on work-based learning in other professional domains has also shown that absence of direct supervision can be very productive as long as the organizational and epistemic environment is rich and offers a range of potential resources (Fuller & Unwin, 2010; Palesy, 2017).

Differences between the two categories of participants may also relate to the type of projects they were working on and how these were organized in space and time. The students worked on their projects over 12–18 weeks, supported by a series of smaller assignments, lectures, and laboratory sessions, and their product as well as their documented process were assessed as coursework. Professional engineering projects vary, but will often be distributed over a longer timespan and carried out in an extended context with more actors and stakeholders involved. Still, we would argue that the use of project-based approaches in engineering education makes the processes in our cases more similar than those previously described in studies of engineering education and work. For instance, Stevens et al. (2014) summarize research and argue that work processes typically deal with ill-structured problems with high ambiguity and complexity as to how problems should be solved and who should be involved, whereas education processes deal with well-structured problems in contexts of clear goals, correct solutions, and a finite set of knowledge resources to draw upon. This does not apply to our cases. Students and professionals alike worked on open-ended problems and accessed a range of resources that were not predefined. In both contexts, the resources served to link their practices with other sites, resources, and actors in the professional domain, which also stimulated further learning. In this way, the participants become linked with the wider "machineries of knowledge construction" that define their profession (Knorr Cetina, 2007; Nerland, 2008), and they could envision further routes for their own professional development while engaging in everyday problem solving.

In sum, we suggest that models for VET, as well as for professional learning and development, should be reconsidered to support exploration along wider epistemic infrastructures and to recognize the self-initiated construction of learning situations and contexts. This also implies the need to understand professional learning as the ongoing construction of, and movement along, epistemic trajectories, in which the affordances of the environment and the agency of individuals are in interplay (Damşa, 2014; Lahn, 2011). From this perspective, learning and knowing are not separable from work but rather constantly entangled in everyday practice (Orlikowski, 2007). In this chapter, we have highlighted the mediating role of distributed knowledge resources and how such resources offer extended learning contexts for practitioners who possess strategies to navigate and capitalize on the epistemic environment. In addition, characteristics of the work organization and its way of creating local learning environments are found to be important for the types of practice-based learning that can unfold in professional work (Fuller & Unwin, 2010). In educational practice, there is, however, a need to gradually introduce students to extended contexts and to support them in framing problems to which such resources can be linked. Using work-related projects as a learning activity is, as illustrated by our examples, a productive way of enhancing student learning while, at the same time, encouraging them in self-initiated exploration and knowledge construction. At the same time, our examples also show that mirroring "authentic" professional situations in educational programs is not straightforward. Educational support is still important, but it should be provided in ways that allow for the exploration of central knowledge resources and participation in the key knowledge practices of the profession, with an eye on what learning challenges these entail for newcomers.

Note

1 "Some of the materials and findings from these studies are previously reported in Damşa & Nerland (2016)."

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21

Innovative Work-Based Learning for Responsive Vocational Education and Training (VET): Lessons From Dutch Higher VET

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Introduction

There is a growing focus on vocational education and training (VET) being directed to the initial development of occupational capacities, as is the case in the Netherlands (Billett, 2017; OECD, 2014). That is, VET is not aiming to make students "job ready," but is considered a starting point for occupational lifelong learning. Nieuwenhuis (2013) states that initial education for the labor market can be seen as a driver's license: We just dare to let graduates drive, but driving skills and routines have to be further developed in practice. It has been argued that some 10,000 hours of deliberate practice are needed to develop sufficient expertise to become proficient (Ericsson, Charness, Feltovich, & Hoffman, 2006); this exceeds the amount of time spent in many VET programs. Moreover, in the light of technological and societal developments, lifelong learning is needed to keep up with innovation and changes in the work field.

One of the main challenges for Dutch VET is to increase its responsivity. Increasing technology (e.g., robots and information and communication technology (ICT) applications) and societal demands (e.g., in health and social services) will change the content of not only work but also employment practices due to increasing labor market flexibility leading to more self-employment and short-term contracts (Cedefop, 2016; SER, 2017). We define *responsivity* as the ability of (teams of) educational professionals to interpret socioeconomic and technological developments for curriculum design in terms of content and pedagogical approach. This is a complex task in a contemporary society featuring a rapidly changing labor market in terms of both technology and institutions (flexible contracts and networks).

Today, the purpose of VET is to equip young people with the knowledge, skills, and confidence to not only engage in the world of work but also make a difference in the transformation of work. VET must enable students to develop

the knowledge, skills, and confidence to actively shape changes in work practices. Our viewpoint is that to develop such knowledge, skills, and confidence, learners have to be supported to actively engage in innovation at work. This means not just being informed about the latest developments, but experiencing what is needed to deal with uncertainty and to organize their own learning in such circumstances.

Twenty years ago, Rosenfeld (1998) argued that what he called "technical colleges" should develop into responsive regional knowledge centers. For his global *tour d'horizon*, Rosenfeld uses the term *technical colleges* for vocational and professional institutions providing programs at International Standard Classification of Education (ISCED) levels 3–6. ISCED is the international classification system for organizing education programs and related qualifications by levels and fields. ISCED 3 equates to upper secondary education, ISCED 4 to postsecondary nontertiary education, ISCED 5 to short-cycle tertiary education, and ISCED 6 to the bachelor's or equivalent level. In Rosenfeld's (1998) view, such regional knowledge centers have four interrelated purposes:

- The education and training of new employees and employers to scaffold the knowledge base in companies
- The supply of up-to-date information and training facilities to update the knowledge and skills of the workforce
- The facilitation of adaptation to new technologies
- The organization of active networks of companies to facilitate interactive learning and innovation processes.

Moore (1995) introduced the concept of public value as the equivalent of shareholder value in public management. Public value is supposed to provide managers in the public sector with a notion of how organizational activity can contribute to the common good. In an interactive research project with Dutch agricultural colleges, Hoeve et al. (2015) redefined these four purposes in three interconnected domains of public value creation, which refers to the value that a public organization contributes to society:

1) Professional education to prepare youngsters for entrance to the labor market
2) Lifelong learning to support professionals and businesses with adaptive and flexible knowledge
3) (Regional) innovation in co-makership with business partners.

This redefinition shows that Dutch VET is challenged to not only deliver initial education but also collaborate with companies and employers to develop "induction" programs for the transition from school to work and to develop flexible programs for adult education. Moreover, in addition to the extended education task, the third public value domain defines a knowledge creation task to fuel regional innovation. This requires adaptive organizations in which new services and network activities are embedded in a flexible organization. Capacity building for the learning region and the learning economy is a core activity for responsive VET institutes (see also Chapter 27, this volume).

Becoming a regional knowledge center is not an easy endeavor and requires a different organization of VET. Nieuwenhuis (2002) reviewed European research on the level of organizational change required in VET colleges to move toward becoming regional knowledge centers and concluded that they were aware of the urgency to develop new ways of education and training for students as well as new ways of knowledge delivery to the region. Yet the realization of regional knowledge centers is slow because colleges become stuck in the implementation phase. Hommen (2002) is skeptical about the responsive capacity of colleges: "Such organizations normally operate within highly institutionalized environments where they are rewarded for establishing correct procedures and processes, not for quantity or quality of their outputs ... consequently they respond to important institutional changes by 'ceremonial enactments of conformity.'" Hommen argues not only for managerial activities but also to seek for bottom-up approaches to involve teachers and professionals in (regional) networking activities.

In this chapter, we give account of the efforts made by Dutch vocational and professional colleges to become regional knowledge centers and how they tried to overcome the barriers mentioned earlier here. Key issues are regional networks between VET and businesses, cooperation, and the role of what we call *innovative work-based learning* (iWBL) arrangements as a means to strengthen this cooperation. iWBL arrangements are specifically designed to enable students to actively engage in innovation at work. Common workplace learning arrangements, such as internships, invoke learning the routines of a working community through legitimate peripheral participation (Lave & Wenger, 1991). In contrast, iWBL arrangements aim at initiating routine change where necessary to keep up with our changing society.

Before going into the details of Dutch developments on building regional knowledge networks and iWBL arrangements, we first will briefly provide the reader with context information on the Dutch VET system. In the third section, we go into the role of work-based learning (WBL) as a catalyst of these developments. In the fourth section, we illustrate this with the case of Thermion, a regional partnership aiming at innovation in healthcare, and draw some lessons on strengthening the potential of innovative WBL. In the final section, we reflect on the potential of iWBL and propose a number of design principles that can act as catalysts for responsivity.

The Dutch Vocational Education System

The educational system in the Netherlands has some distinctive characteristics (OECD, 2016). To an outsider, the Dutch system is striking because of its breadth, complexity, and strong institutional emphases (Billett, 2017). It combines early selection at the age of 12 for junior general education and junior vocational tracks with an inclusive system for secondary vocational education and a binary system for higher education. As a result, a vocational qualification can be acquired at different levels and in different tracks (see Figure 21.1).
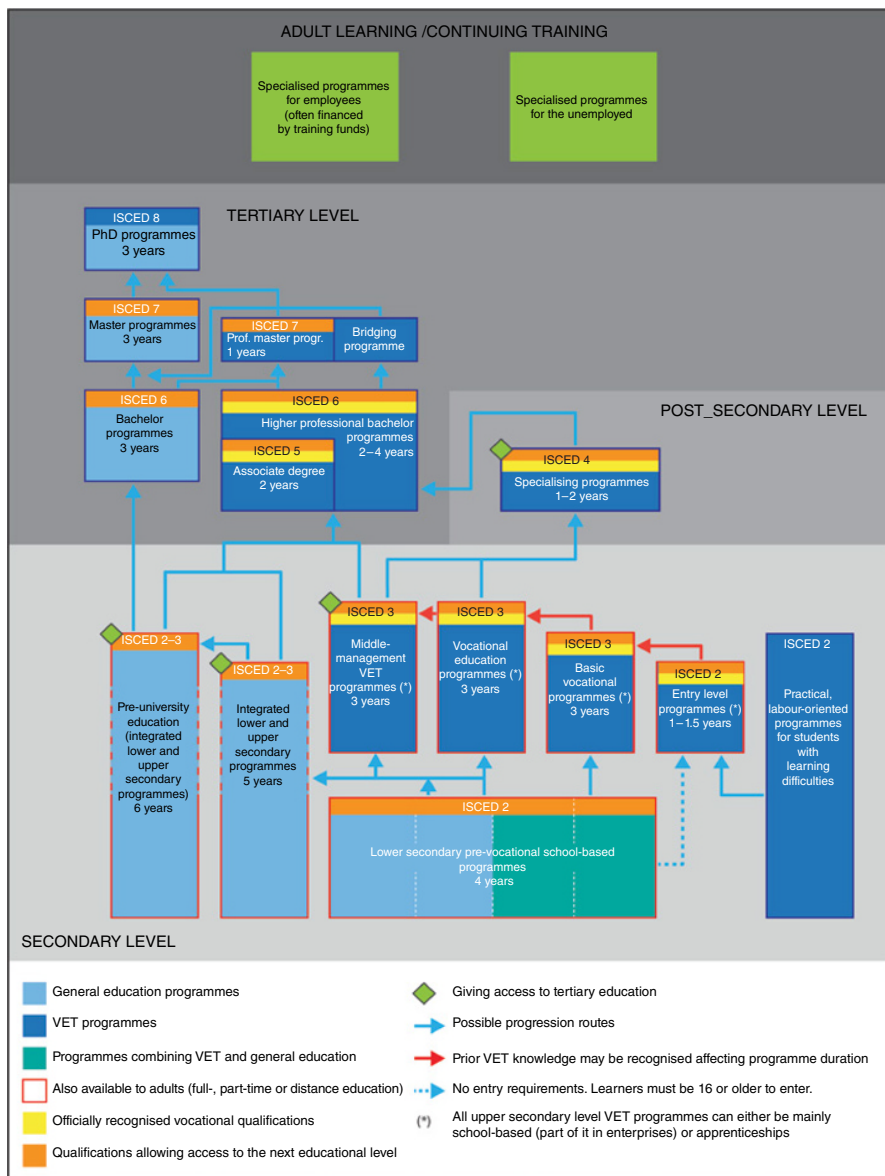
Figure 21.1 VET in Dutch education and training. *Source:* Adapted from Cedefop (2016).

In general, we can distinguish two main tracks leading to vocational qualification for the labor market: (a) secondary vocational education and training (SVET; in Dutch: MBO), or the SVET track; and (b) higher professional education (HPE; in Dutch: HBO), or the HPE track.

After finishing junior vocational education at the age of 16, each young person is supposed to follow courses in secondary vocational education in order to gain a labor market entry qualification at ISCED level 2, 3, or 4. About 50% of Dutch students finish their educational career with a vocational qualification in this

track. A qualification at ISCED level 3 or 4 serves also as a permit to enter HPE, and about 25% of the students make the choice to enter HPE. The Dutch labor market at the secondary level can be characterized as an occupational labor market. Policymakers, employers, and students and their parents see secondary VET as the normal pathway for entering the labor market (Nelen, Poortman, de Grip, Nieuwenhuis, & Kirschner, 2010). The Dutch SVET is a mixed model, as a dual form of VET (school-based and work-based) and school-based VET are combined in one system, although dual VET has been declining over time. In 2016, about 25% of students followed dual tracks and the other 75% school-based tracks, always combined with periods of in-company internships. The OECD (2009) has recommended such "mixed models" for SVET, because of the flexibility of the pathways and because of the collaboration between public and private partners: Government and social partners have common interests in the design of such VET systems. Youth unemployment is low in the Netherlands, whereas the skills level of the labor force is relatively high.

The second track to vocational qualification is through higher education. Dutch higher education is binary: Two distinct routes and institutions form the landscape of higher education. Research-oriented universities educate around 15% of students for academic qualifications through bachelor- and master-level programs, whereas institutes for HPE educate 35% for professional practice through school-based bachelor programs combined with periods of in-company internships. These institutes also offer professional master programs, but for professional entry, the bachelor's degree is sufficient.

Both the SVET and HPE are public systems in the Dutch society. This is in contrast to some other countries, where systems for SVET are less developed or even underdeveloped and where HPE is often partly privatized (OECD, 2009). Nelen et al. (2010) argue that the design of VET depends on the economic features of the labor market at the intermediate level. A distinction can be made between occupational labor markets (where public investments are made in the occupational skills of young people) and internal labor markets (where employers decide on investments in workers' skills). Occupational labor markets are connected to Rhineland economic models (especially in Northwest Europe), whereas internal labor markets operate in Anglo-Saxon economies and in developing countries (for an early discussion of the concepts, see Eyraud, Marsden, & Silvestre, 1990).

In this chapter, we focus on developments in the HPE part of Dutch vocational education. We discuss the efforts of HPE institutes to become regional knowledge centers by means of innovative WBL. This is illustrated by a case study from the healthcare field. The lessons from this case are captured in a set of design principles that should also be applicable in SVET.

The Role of Work-Based Learning in Regional Innovation

The challenge of building regional networks and participating in regional innovation is increasingly seen as part of the role of HPE institutes. These institutes have ambitions to become Universities of Applied Sciences (UAS) and so regard

playing a key role in stimulating regional innovation as important A main characteristic of the UAS sector is the investment in programs for applied research in co-makership with professional domains; that is, stakeholders from education and labor shape and specify these programs (De Bruijn, Billett, & Onstenk, 2017). Not surprisingly, due to UAS development, collaboration between the UAS sector and their business partners is growing in prominence (Davey, Baaken, Galan Muros, & Meerman, 2011). In the economics literature, this cooperation is called *university–business cooperation* (UBC) (Pavlin, 2016; Rampersad, 2015). Consistent with the line of reasoning of Rosenfeld (1998) in the chapter introduction, educational institutes need to participate in regional development (Lee, 1996; Motohashi, 2013), whereas regional employers need access to recent academic and professional knowledge.

Collaboration is difficult in practice. Pavlin (2016) describes the cooperation between the UAS sector and employers, and identifies some similar perspectives concerning the drivers for UBC (mutual trust, commitment, and shared motives) and UBC outcomes (the development of competencies). However, Pavlin (2016) also identifies differences in perspectives between the UAS sector and employers. Large differences are found in structures and approaches (e.g., in terms of the role of the employer in the development of graduate competencies) and UBC barriers (employers mention the bureaucracy in HPE, whereas the biggest obstacle for HPE is the difference in time horizons). Such factors create specific challenges for UBC, including for example the relevance of courses, the employability of graduates, the demand for further professional training at the workplace, responsiveness to social and technological developments, recruitment problems of skilled workers, and the innovative and absorptive capacity of enterprises. Local, national, and European Union (EU) policies embrace the need to create a more connected and functioning relationship between government, business, and the UAS sector in order to increase employment, productivity, and social cohesion (Davey et al., 2011).

The main approach for UBC development is along the lines of knowledge creation in training and research and development (R&D). Several modes of UBC comprise various forms of collaborative R&D, including mobility of students and employees, and "co-makership" for course development and adult learning. Pavlin (2016) identifies two main dimensions of UBC modes, with similar importance for both a UAS and employers, including small and medium-sized enterprises (SMEs). The first relates to research and mobility (R&D, and mobility of academics and students), and the second relates to teaching activities (curriculum development and delivery of adult education, training, and short courses).

WBL is a complementary, promising approach to UBC development, focusing on the competence development of students (Narayanan, Olk, & Fukami, 2010; Rampersad, 2015). This involves immersing students in authentic innovative projects, and enables them (in cooperation with a UAS and enterprise professionals) to experience the complexity of innovation. iWBL projects for UAS students are focused on innovation and design of new professional practices, commissioned by local employers. Enhancing a constant flow of such innovative projects results in a student population acquiring twenty-first-century professional competences, and it results in stronger knowledge linkages

between the UAS sector and employers. Such linkages are beneficial for a continuous exchange of innovative ideas, fueling both the research agenda of the UAS and the innovation agenda of businesses. iWBL projects are thus catalysts for UBC.

WBL is seen as a powerful tool to enhance UBC because the cooperation supports regional economic prosperity through the establishment of strong knowledge networks and innovative local communities (Narayanan et al., 2010; Rosenfeld, 1998). Involving the student as a partner in work-integrated, authentic innovation projects results in a knife that cuts both ways. On the one hand, the UAS sector, SMEs, and large businesses have benefits in the field of knowledge creation processes (the inflow of new ideas and research ideas, strong linkages, and accessible networks). On the other hand, new generations of professionals are educated and trained for the innovative work processes needed for an unpredictable economy and labor market. As Narayanan et al. (2010) point out, to realize such benefits, all stakeholders involved need to create a strong basis for cooperation (the antecedents) and invest in the process.

WBL has the potential, therefore, to enhance regional and economic development through UBC. WBL is a powerful instrument at the intersection of the public value domains because it supports the entrance of young people to the labor market, it is the carrier for lifelong learning activities, and it connects knowledge development in enterprises to knowledge development and research at the universities. Students' involvement in innovative WBL projects has triple impact. The aim is to develop innovative WBL projects on the edge of university programs and business development. UAS students, UAS staff, and business employees will be challenged to investigate and innovate cooperatively in WBL projects targeted at social and economic issues that need new solutions.

Sfard (1998) proposed two intertwined metaphors of learning: acquisition and participation. Learning can be seen as the acquisition of skills and knowledge, but it can also be seen as a social process of belonging to a community. Paavola, Lipponen, and Hakkarainen (2004) challenge these two metaphors of learning, stating that both metaphors describe reproductive ways of learning, which are not applicable in innovation where the knowledge-to-be-reproduced is under construction. They propose a third, knowledge-creating metaphor of learning in which learning is seen as deliberately producing new, innovative knowledge and social practices. Lehtinen, Hakkarainen, and Palonen (2014) use this insight to build a learning theory for the professions in times of rapid change. They argue that traditional vocational and professional education is based on an application mode of transfer: Knowledge and skills learned in education are widely applicable in a diversity of professional situations. This application mode stands on the assumption that tasks are rather stable and that transfer "reproduces existing relations between fixed tasks" (Lehtinen et al., 2014, p. 8). In times of rapid change, fixed tasks are becoming rare, and the professional should be prepared for future learning activities. Lehtinen et al. (2014) argue that the application mode must be replaced by a construction mode, in which the professional constructs and produces relations of similarity: This involves the professional interpretation of new situations and phenomena as starting points for the deliberate practice of new skills and applicable knowledge. Mainstream education theories

do not help to understand how professionals should be educated to deal with rapidly changing situations. Jonassen, Strobel, and Lee (2006) argue that the traditional view on transfer does not prepare technical students for everyday problem solving and instead stress the need for preparation for future learning in working situations. They argue that the need for continuous lifelong learning has never been greater in modern engineering work contexts. Professional programs should support learning to solve complex and ill-structured workplace problems to prepare students for future learning and work.

Innovative Work-Based Learning in Practice: The Thermion Case

Based on the insights described in this chapter, the HAN (in Dutch: Hogeschool van Arnhem en Nijmegen), a large UAS in the eastern part of the Netherlands, strives for responsive higher vocational education in all its professional fields. The Faculty of Health and Social Studies, for example, has been piloting iWBL driven by changes in healthcare and healthcare systems. These changes include a changing population (e.g., a growing number of aging patients with multimorbidity), new perspectives on health (from disease-oriented toward functioning and self-management), and developments in health systems that involve a shift from hospital care toward primary care. The societal issues healthcare workers have to deal with are becoming increasingly complex and diverse. These issues include the shortage of health workers, the breakdown of professional silos, and the development and implementation of e-health. So-called Sparkcentres are developed as innovative hubs on the edge of education and work. The name Sparkcentre originates from the idea that these innovative hubs serve as a spark for innovation in health and social care and also innovation in the professional education programs preparing novices for these fields. The HAN Sparkcentres are assigned their status by the Zorgpact, a national council that promotes innovation in health policy, practice, and education. They are situated in primary care or community centers in the Arnhem–Nijmegen region (in the eastern part of the Netherlands). In these environments, 25–30 students from different healthcare disciplines, two embedded teacher-researchers, and practitioners work together with citizens on authentic issues in healthcare.

The Sparkcentres offer iWBL arrangements in which students, faculty staff, and professionals encounter workplace problems that are complex and need different perspectives to find workable solutions. Both students and professionals are challenged to solve problems through interprofessional collaboration, which is collaboration of different professional disciplines in cooperation with practice-based research. One of the first Sparkcentres started in 2013 and is located in an academic primary healthcare center called Thermion. A renovated factory building in a new developed neighborhood accommodates 14 different professional practices, including general practitioners, pharmacy, occupational therapy, physiotherapy, district nursing, midwifery, psychological counseling, and social work. Although the different professional practices are assembled under one roof, they remain as separate economic units. The interprofessional iWBL

arrangements are developed and enacted in collaboration with local organizations for healthcare and social work. The relation between education and practice is inherent in the definition of *interprofessional work* in healthcare: Different professionals learn with, from, and about one another, with the aim to collaborate more effectively in the delivery of high-quality patient care (WHO, 2010). By integrating a research perspective in these environments (involving researchers in practice-based research projects for students), we strive for the following (educational) goals for students, professionals, and staff: becoming a reflective practitioner and developing critically reflective work behavior; enhancing knowledge about the professional field; and enhancing knowledge about or insight into scientific research and development of research skills to support evidence-based practice and contribute to innovation. The involvement of researchers in the professional field enhances research capacity building and faculty development in the education of health professionals.

All these professionals have to cope with continuing political, financial, social, and cultural developments that necessitate the development of new models of primary healthcare. So-called person-centered healthcare is one such model. Person-centered care is focused and organized around the health needs and expectations of people and communities, rather than on diseases. (WHO, 2016). Whereas patient-centered care usually focuses on only the individual as a patient, person-centered care also includes attention to the health and well-being of citizens in their communities and their crucial role in shaping health policy and health services (WHO, 2016). The professionals in Thermion have stressed the urgent need to further develop innovative community-based and person-centered care in their daily practice.

In the first phase of the initiative, a dialogue was organized between educational staff of both HAN (responsible for educational programs in paramedic studies, nursing, and social studies) and Rabout University (responsible for the education of general practitioners) and health and social care professionals in Thermion. This dialogue aimed at creating a shared vision of future healthcare and professional development. In the second phase, a physical space was designated at the premises of Thermion as an innovation lab, which was envisaged as the home of a future community of learning and innovation in person-centered care, consisting of students, teachers, researchers, professionals, and clients.

Educational researchers from HAN-UAS (including the authors of this chapter) were involved to execute design science research (Van Aken & Andriessen, 2011) to support the design and implementation of the Sparkcentre educational model. We expect this approach to provide a solid educational, organizational, professional, and interprofessional foundation for embedded iWBL as a catalyst for responsive vocational education. The design-based research approach will allow us to create a CIMO framework (context, interventions, mechanism, and outcomes) for the development of iWBL and its integration into higher education, which will be broadly applicable both within HAN and beyond. The involvement of research is thus part of a valorization strategy that is compulsory for UAS institutes (i.e., part of policy agreements between the Dutch Ministry of Education and higher education institutes). In this chapter, we present insights

from the first iterations of this research (Hoeve & Nieuwenhuis, 2015; Kuijer, Hoeve, & Hendriks, 2017), which mainly focus on the design and implementation of iWBL arrangements. In these iterations, data are gathered through analysis of written progress documents and materials, focus group interviews with students and professionals, and regular evaluation sessions with all stakeholders involved.

The initial design of the Sparkcentre is that each semester, two groups of students join the Thermion health center. The first group, consisting of 10–15 students from HAN-UAS, follows their timetable of disciplinary internships and collaborates in an interprofessional education program. A second group of 15–20 students works on (inter)disciplinary innovation and practice-based research projects. The design of the iWBL arrangement at Thermion includes elements of both WBL (activities in the interprofessional program) and workplace learning (the internship and/or participation in practice-based research projects). The idea was that by engaging in an interprofessional education program and interdisciplinary research project, students could fulfill the role of change agents in relation to community-based and person-centered care. Teachers and researchers from HAN scaffold these students' professional development, activities, and projects on-site and in collaboration with the practitioners. The students' learning and the insights they develop about concepts and models of person-centered care would comprise an incubator for development of the professionals (the first actively involved as supervisors).

Over the course of three academic years from 2013 to 2016, some 50 students from seven different bachelor programs have fulfilled their internships at Thermion and participated in the interprofessional education program. Overall, 106 students have been involved in the research projects. These students report that their engagement in interprofessional activities at Thermion was interesting and challenging, but frustrating at the same time. They had experienced Thermion as a powerful learning environment. Yet, the students struggled with their role as change agents as they kept wondering how they were supposed to induce change as novices in their field and innovate and cross borders between different professional fields. This caused us to consider using a different approach for contributing to the learning of students, enhancing lifelong learning, and contributing to regional innovation.

Over the course of the research period, the focus has shifted from the initial idea of the student as a change agent to the concept of the student as a boundary crosser (Akkerman & Bakker, 2011). At the start, it was expected that the group of students participating in the Thermion work practices could take the role of change agent. The concept, which was adopted from the field of organizational development, sees the change agent as someone who can bring about change in an organization. Evaluation of student experiences revealed that they felt they are not in the position to influence change within existing practices. Some expressed the feeling that being new (to the organization) and unexperienced is not a good starting point to start talking about change to the professionals who work there. However, at the same time, the students recognized that they can facilitate change by bringing in new elements from their university learning, from research, and from other practice settings. Furthermore, they came up with

ideas to deliberately design activities to bring professionals in contact with these elements. So, where the term *change agent* placed the students under a heavy burden, the term *boundary crosser* or *broker* was felt to be more inspiring, as doing more justice to the position the students are in.

Within the interprofessional education program, boundary activities have been developed (see Chapter 18, this volume). These activities were not so much designed for the students, but mostly for professionals. The students had an active role in engaging the professionals in the boundary activities. For example, an activity called (in Dutch) the *stoelendans* (based on the ideas of the children's game Going to Jerusalem) is aimed at changing professional perspectives and challenges professionals to switch from thinking and acting from their own professional expertise toward the needs of the patient. In this game, we place a group of different professionals from health and social care in a circle to discuss a patient case, and the group members step forward if they think they can add their own professional value. In this step, professionals become aware of the need for interprofessional collaboration and coordination of care. After a certain time, each professional is instructed to sit on the chair of his neighbor and look at the case from his neighbor's professional perspective. This invokes the learning mechanism of perspective making and taking: recognizing and acknowledging different professional perspectives in relation to patient needs. This game is a powerful boundary activity, due to the authentic situation, the involvement of different professional disciplines, the actual involvement of the patient, and the reflection process guided by the students and teachers.

Boundary crossing also takes place in a purposively assembled community of practice (CoP) in Thermion, in which students, teachers, researchers, and citizens learn and work together to contribute to a "Lively Lent" (Nijmegen Lent being the area where Thermion is located). The activities within Lively Lent should contribute to the self-management of elderly people and to the possibility of being able to continue living independently at home. This CoP started with collaboratively defining when Lively Lent is a success, then exploring the needs and conditions to work in, resulting in concrete activities to work on. Once every 6 weeks, the community members come together in a meeting to learn from, with, and about each other. All four learning mechanisms are at issue in this CoP. The main challenge in the CoP is creating continuity; recalibrating the why, how, and what of Lively Lent; and maintaining ownership in the network of professionals and citizens, despite or thanks to the involvement of changing student groups each semester.

This case study of Thermion reveals that learning and innovating in a Sparkcentre require new roles for students, professionals, teachers, and citizens. They are all challenged to engage in boundary activities in which the learner is not necessarily the student, the designer of learning activities is not necessarily the teacher, and the expert is not necessarily the professional. It takes time to develop these roles, adapt to these roles, and get familiar with role switches. Another lesson from this case is that practice-based research projects were interesting, but did not automatically result in a collective body of knowledge. Students involved in research projects, but not involved in the CoP, reported that they felt they hardly contributed to the further development of person-centered

care at Thermion; sometimes, they felt the results of their research were destined for oblivion. Besides, they ran into the borders of their own professional educational criteria, which obstructed collaboration in practice.

Two important lessons were drawn from student feedback. First, it requires cooperative effort from faculty staff and professionals to formulate a common research agenda as a driver for collective knowledge building. This resulted in more strategic cooperation in networks. Second, students need to be better prepared for interprofessional research. This created the urgency for the implementation of interprofessional education in the HAN curricula, in order to permeate existing boundaries between the different educational programs strongly rooted in their own disciplines.

This brings us to the basic principle underlying the Sparkcentre approach: It takes collective effort or co-makership from faculty staff and professionals. The findings from research on and experience of the Thermion case show that co-makership is not an easy process. It requires mutual trust, a common language, and the willingness to attune to the pace of the work process and environment. It requires the development of new ways of working that need to be embedded in existing work practices and curricula. The case of Thermion is forerunner for the development of health professions' education in the HAN Department of Health and Social Studies. As a result of the perceived success, these pilots have been recently scaled up and iWBL arrangements are to become a regular feature of all faculty programs.

Sparkcentres bloom and flourish, not only in the social department but also in the technical departments of the UAS sector, where they are called *innovation hubs*. The processes described by Narayanan et al. (2010, fig. 1) can be seen as arrows in the UBC triangle (see Figure 22.2): Students' activity (A), business activity (B), and faculty activity (C) add to the regional impact of authentic iWBL. Arrows E and D stress the importance of practitioners' and faculty's impact on the interaction between the other two partners, both aiming at enhancing long-term UBC.

In such an innovative WBL, the focus is no longer on the interaction between student and teacher, but on the broader work context. Students' learning and
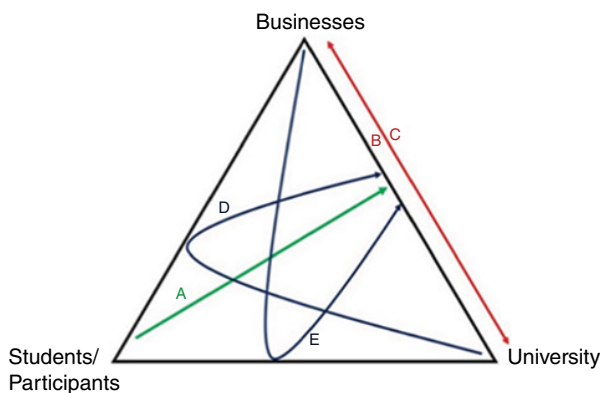
Figure 22.2 Innovative WBL as catalyst for university–business collaboration.

working are closely linked. Self-regulation of learning processes and career development are important. The iWBL model supports the students to encounter real-life working problems so that complex formal and informal learning can take place in interdisciplinary settings. Autonomy, collaboration, and interprofessionality are all at stake. For practitioners and faculty, the iWBL offers ample possibilities for networking and co-makership.

Innovative WBL and regional responsiveness require new ways of operating on the part of the UAS sector. Fullan (2007) introduced the term "capacity building" to embrace new knowledge, skills, and competencies; enhanced resources; and stronger commitments. It is a complex mix of motivation, knowledge, and skills, scaffolded through organizational measures. Capacity building is trifold: It concerns personal capacity, interpersonal capacity, and organizational capacity.

The transformation from an HPE college toward a regional UAS can be characterized as a process of innovation, targeted at a completely new way of working. In the organizational literature, the concept of routines is used to disentangle process innovation (Hoeve & Nieuwenhuis, 2006). Routines are collective, recurrent action patterns. They describe who is doing what and when and thereby define actions and roles. Routines are knowledge carriers: Enterprise knowledge is consolidated in (organizational) routines. Routines are flexible: They enhance professional actions within communities of practice (Wenger, 1998), in interaction with changing economic contexts. There is always a tension between the need for efficient, routine-based action and the development of innovative ways of working. At the boundaries between different communities of practice, the urgency for innovation becomes visible. The model of boundary crossing gives tools to analyze boundary-crossing processes, as they exist between a UAS and its professional practices.

Lessons for Organizing Responsive VET

In this chapter, we argue that, for a more responsive VET (i.e., vocational education that is connected to technological and socioeconomic developments in the workplaces), we need to design iWBL arrangements. The concept of iWBL bridges the gap between education and innovation. In the literature on the link between professional education and regional development, innovation and education are disconnected. In the literature on regional development (cf. Cooke et al., 2011), professional education is seen as a regional asset (i.e., another resource the industry can deploy for economic development). Whereas in the literature on vocational and professional education, economic innovation is seen as contextual (i.e., something that can be used as another inspiring example from practice that helps to motivate the students), iWBL has high potential as a linking mechanism between education and innovation (Narayanan et al., 2010; Nelen et al., 2010; Rampersad, 2015). Nelen et al. (2010) shows that combinations of work and learning can have an impact on both labor market entrance for graduates and the absorptive capacity of enterprises: iWBL has impacts on enterprise productivity and innovativeness. As we showed in the Thermion case in this chapter, iWBL can bring about boundary activities that invoke routine change in

professional practice. Rampersad (2015) argues that WBL (she calls it *work-integrated learning* [WIL]) offers the missing link between teaching on the one hand and research and knowledge utilization through commercialization on the other. In Thermion, we see that practice-based research can be an activating learning arrangement, which motivates the students because they do not learn for the teacher or themselves but to induce progress in their professional field. Narayanan et al. (2010) shows proximal and distal benefits from internships for both universities and employers, besides benefits to students (placement and career prospects). Both for universities and for enterprises, a reciprocal flow of new ideas and knowledge is the result of stronger linkages through WBL. So WBL has the potential to enhance regional and economic development through UBC. WBL is a powerful instrument at the intersection of the value domains, because it supports the entrance of young people to the labor market, it is the carrier for lifelong learning activities, and it connects knowledge development in enterprises to knowledge development and research at the universities.

However, as the Thermion case shows, the implementation of iWBL environments requires careful designing and the willingness of the actors involved to regularly evaluate and adapt the initial design. Based on the lessons of the Sparkcentres combined with Cremers' rules of thumb (Cremers, 2016), a set of design principles is formulated, which can (and will) be used for further implementation and evaluation of the Sparkcentre and innovation hub concepts.

- *Organize insights in future developments of the sector*. Discuss with students and practitioners scenarios for future development of the professional domain, also in relation to the impact of these developments on the work processes and professional competencies needed. Next, discuss educational requirements for the domain.
- *Map existing affordances for learning*. Onstenk (2003) has developed a model for the learning potential of the workplace, consisting of the following elements: job autonomy, variation in tasks, complexity of the work, and social context (participation, room for decisions, modes of interaction, guidance, and feedback). Billett (2001) argues that a workplace with high learning potential does not automatically lead to high-level learning: Students should develop agency to use the workplace affordances and should be supported to do so.
- *Develop transformative leadership*. Transformative leadership refers to a style of leadership sustaining collective stakes and supporting collaborative goals. Truijen (2012) shows the impact of transformative leadership on collective learning in TVET teams. Combining transformative and transactional leadership is a promising alley for both practitioners and faculty management.
- *Develop professional guidance*. Swager, Klarus, Van Merriënboer, and Nieuwenhuis (2014) makes clear that guidance at the workplace needs lot of improvement. De Bruijn and Leeman (2012) call for coaching, modeling, and scaffolding as guidance strategies to be combined. In professional learning communities as iWBL strives for, students, practitioners, and teachers are (co) learning. This requires specific faculty competences.
- *Connect dimensions of learning*. Be aware of the interplay between several modes of learning: formal-informal, or acquisition-participation-creation.

This also leads to thinking of sequences of practical learning: iWBL can be preceded by a "pre-service" period, in which students are training for specific skills, or by forms of simulation, in which students are allowed to make mistakes without endangering patient safety. In most professional courses, such pre-service and simulated periods are built in, but they are not always very sophisticated.

An iWBL arrangement can be seen as a targeted action to "catch" regional innovation within a defined setting of action. Innovation of professional actions always combines spatial and domain-specific aspects: Professionals seek workable solutions within specific local communities and networks. UASs can support this by faculty's applied research and by students' innovative WBL. An iWBL organizes boundary crossing between the domain of working and the domain of learning. As such, iWBL serves as a focal point for process innovation at both sides. This is tough, because professionals and UASs are inclined to stick to their own routines. iWBLs can be seen as spaces for development of new ways of collaboration through trial and error. Boundary crossers (both from faculty and practice) need support to do this job; it is too great a challenge to assign the role of change agent to the students alone.

In conclusion, the development of iWBLs as catalysts for regional development not only asks for a clear vision on students' learning and development, but also for a strong change program for (inter)organizational routines and a regional innovative movement.

This analysis leads to some additional recommendations and design principles for the development of iWBLs:

- *Collaborate on course development.* Educational teams in initial and higher VET should be set up as "extended teams," in which practitioners and teachers work together on curricula for initial and lifelong learning within and across professional domains.
- *Develop a human resource development (HRD) perspective on education.* SVET and HPE not only are targeted at initial education of youngsters but should enhance lifelong learning and development over the life course of professionals. This counts not only for novices and professionals but also for UAS faculty members. Also, teachers and educators have to be involved in lifelong learning endeavors.
- *Capacity building and routine change.* Faculty management should be eager about process innovation and the consequences for capacity building. Routine change asks for concerted action; external pressure can support the process.
- *Facilitate boundary crossers.* Faculty management should cherish the boundary crossers and support them in their challenging task. Often, boundary crossers are distrusted, and they enter contexts in which they are not specialized.

Both initial and higher institutes as well as their business partners have to develop new "organizational routines" to be able to cooperate effectively (see Davey et al., 2011). The target set of design rules supports VET institutes and businesses partners to develop innovative WBL projects, which, on the one hand, offer adventurous possibilities for students to acquire future-proof flexible

professional competences and lifelong learning skills, and, on the other hand, elicit new linkages and exchange of new knowledge between university faculty and business. Over the long term, this will feed both the innovativeness of enterprises within the regional economy and the responsiveness of VET programs and programs for applied research in higher VET.

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22

Capturing the Elusive: How Vocational Teachers Develop and Sustain Their Expertise

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Introduction

The question of how expertise is used, developed, and sustained (over time) is one that has consistently engaged researchers and practitioners in vocational education and training (VET) worldwide. Two main strands of thought have fueled the debate. The first strand can be seen as emerging from dominant conceptions of expertise framed by cognitive psychology where expert knowledge is understood as residing in the heads of experts, held in an individual's memory and defined, therefore, as personal expertise. In contrast, alternative conceptions of expertise are framed by social theories of learning and by social anthropological perspectives. These accept that the deployment of knowledge and skills depends on situational factors. In this framing, expertise is understood as part of the ongoing movement toward full participation in, and the formation of identity within, a particular community of practice (Lave & Wenger, 1991). From this perspective, participation in a particular social practice is both the foundation for the development of expertise and the context in which expertise is developed. Expertise is therefore conceived as existing within networks as shared vocational knowledge. Emerging from these two contrasting perspectives is the conception of expertise that frames this chapter, a conception that sees expertise as being both personal and shared within contextual networks.

In this chapter, we explore the ways in which vocational teachers' expertise is used, developed, and sustained in practice. Our intention is, first, to inform ways of thinking in relation to supporting the development of vocational teachers' expertise; and, second, to demonstrate that the complexity described here requires distinct approaches to the exploration of the phenomena of teachers' development of expertise. Our exploration draws on our respective research projects, which have focused on the development of expertise from the perspective of two groups of vocational teachers: trainees (Lahiff, 2014, 2015, 2017) and

experienced teachers (Broad, 2013, 2015, 2016) in England. These two groups are important for any exploration of expertise as they can be seen to epitomize different stages in a transition process from expert vocational practitioner to expert vocational teacher. Although the routes that vocational experts take into teaching, the training received, and the contexts in which teaching takes place vary across countries and reflect the cultures in which they are located, the transition process itself can be understood to be universally framed by complexity. This complexity exists because although initially recruited to teach on the basis of acknowledged vocational and occupational expertise, vocational experts then undergo a "process of becoming" a teacher (Colley, James, Diment, & Tedder, 2003). This process is characterized by the development of an acknowledged dual identity (Bathmaker & Avis, 2005; Fejes & Köpsén, 2012; Orr & Simmons, 2010; Robson, 1998). Vocational teachers need to face toward both the requirements of their occupation and the learning needs of their students.

Such Janus-like activity requires, in the first instance, a high level of expertise in their occupational area. On bringing this knowledge and expertise into learning environments, the requirement becomes one of developing knowledge and understanding of pedagogic practice. In this endeavor, they can be seen to be involved, as Moodie and Wheelahan (2012) have argued, in the reformulation of vocational knowledge from work, where it has mainly a productive function, to a teaching and learning function. Second, although initially recruited as teachers because of their vocational and occupational expertise, the longer they remain as vocational teachers away from their occupational workplaces, the greater the need to refresh their knowledge of current vocational practice.

Following this introduction, the chapter examines how we conceptualize vocational knowledge and expertise. Our argument here is that they are inherently complex. They are both shared and developed in practice, highlighting the importance of contextual factors. We draw on sociocultural theories of workplace learning to shed light on the distinctive nature and characteristics of vocational knowledge, and we acknowledge that it is tacit and largely uncodified. Following Nespor (1994), we draw attention to the vocational as being temporal, with high levels of currency, rather than static.

This is followed by a focus on the methodological approaches we used to research the development of trainee teachers' and experienced vocational teachers' expertise. We argue these enabled us to develop frameworks through which vocational knowledge and expertise could be researched and analyzed. To explore the development of trainee teachers' pedagogic expertise, Lahiff uses cultural historical activity theory (CHAT) to model teaching observations—an accepted process used to evaluate teachers' practice—and observes vocational teachers in situ to understand the process of pedagogic development. Broad, in her research on experienced vocational teachers, uses the conceptual framework of actor–network theory (ANT), which sheds light on the complexity and heterogeneity of the maintenance of expertise and allows a mapping of the pathways and trajectories that vocational teachers follow.

Drawing on our respective research with vocational teachers, we then explore the mechanisms and processes that vocational teachers use to develop and maintain their expertise. The purpose of these sections is twofold. First, we discuss

and illustrate the ways in which vocational teachers' pedagogic expertise is developed at an early stage of occupational transition, through teaching observations (Lahiff, 2015, 2017). Second, we discuss and illustrate the myriad ways in which experienced vocational teachers engage with continuing professional development (CPD) activities, including membership of professional associations, through which to maintain and enhance their occupational knowledge (Broad, 2015, 2016).

From here, we draw the two discussions together by identifying both the common elements in the development of vocational teachers' expertise and the elements that are specific to the development of pedagogic, as opposed to vocational, expertise. We conclude by offering suggestions in relation to informing the ways of thinking and supporting the development of vocational teachers' expertise.

The Development of Expertise and the Nature of Vocational Knowledge

This section begins by examining debates concerning the development of expertise and the nature of vocational knowledge. Both of these are marked by the centrality of context and inherent complexity. With reference to context, Fuller and Unwin (2011) argue that the working environment needs to provide opportunities for the development of expertise through practice with others and include the development of "tacit knowledge and skill" (p. 37). However, unlike Lave and Wenger (1991), they argue that the apprentice also needs access to types of knowledge and expertise that will enable them to "grow beyond, as well as within, their current job role and sector" (Fuller & Unwin, 2011, p. 37). In so doing, they signal the interrelationship of social practice and individual capacity in the development of expertise (Lahiff, 2014).

This perspective raises questions related to the nature of vocational knowledge. Fuller et al. (2003) argue that the possession, development, and utilization of skills can be "hidden" and as such has been the focus of much interest. The extent to which vocational knowledge is on the whole tacit, nonformal, and largely uncodified is debated in the literature (see, inter alia, Hordern, 2014; Polanyi, 1967). Polanyi (1967) argued that there are two forms of knowledge used by vocational experts: codified (theoretical) and tacit (practical). He described tacit knowledge as that which we know but cannot tell; hence, revealing and understanding tacit knowledge are difficult because it resists codification (Livingstone & Guile, 2012). It is incorporeal and thus problematic to capture and examine. Kotzee (2012) argues that Schön's (1987) work is infused with Polanyi's concept of tacit knowledge. Schön (1987) takes further the discussion regarding the hidden nature of tacit knowledge and argues that "we know more than we can tell and more than our behaviours consistently shows" (p. 22). The significance of this is highlighted by Frankham (2006), who argues that we cannot "break down the apparent component parts of knowledge and understanding and present them as a series of steps to be followed to completion and predetermined outcomes" (p. 668). She adds that this is due to the complexity of

vocational knowledge in use, whereby many clues are used simultaneously when arriving at professional judgment.

Developing Polanyi's conceptual approach, Eraut (2000), in exploring the hidden factors of learning and knowledge in professional work, developed two distinct definitions of knowledge (codified knowledge and personal knowledge) and uses them to examine where knowledge resides. He explains that codified, propositional knowledge can be viewed as public knowledge in that it is open to review and control by others. Personal knowledge is an internal resource held by an individual and can be deployed in practice settings. Within Polanyi's original conceptualization of tacit knowledge, both Canning (2008) and Kotzee (2012) suggest that Polanyi sees tacit knowledge as residing within the individual. However, Fox (2000), drawing on Lave and Wenger (1991), suggests that rather than residing within the heads of individuals, tacit knowledge is situated within communities of practice.

Similarly, Collins (2007), who distinguishes between "somatic-limit" tacit knowledge (personal) and collective tacit knowledge (shared within networks), uses Polanyi's analogy of riding a pushbike to explain tacit knowledge. He distinguishes between what he terms *bike balancing* and bicycle-riding proper. Bike balancing is the simple ability to be able to balance and steer, whereas bicycle-riding proper brings together a whole host of skills and abilities from negotiating other traffic, rules of the road, and other road users to communicating with drivers at busy junctions. This analogy is also used to highlight the importance of context when he explains that "bike-riding in Amsterdam is a different matter to bike-riding in London, or Rome, or New York, or Delhi, or Beijing" (Collins, 2007, p. 259). He argues that this complex tacit knowledge, the bicycle-riding proper knowledge, "is located in human collectivities and, therefore, can never be the property of the any one individual" (Collins, 2007, p. 260). This debate complements those regarding whether vocational expertise is developed by the individual through shared practice or is subsumed by the individual through engagement in contextual social practices. The latter also accepts that expertise is distributed (Hutchins & Klausen, 1996). Drawing on the work of Nespor (1994), who views learning and knowing as emerging through materializing networks and network practices (Fenwick & Edwards, 2013), Broad (2016) highlights a further complexity. She argues that vocational knowledge is temporal with high levels of currency. It is in constant development, changing and melding to the specific needs of a particular organizational context and setting.

Regardless of the difficulties, understanding what is meant by vocational knowledge is imperative to understanding the development of expertise. Its importance cannot be discounted for a number of reasons. First, as Ashton (2004) argues, much of the knowledge within an organization is tacit and specific to that organization; more succinctly put, it is bound to that particular context. Second, Livingstone and Guile (2012) suggest that within learning organizations, tacit knowledge is increasingly important for the production of new knowledge and thus is the most important form of knowledge within learning organizations. Third, a fuller understanding of the development of expertise also requires cognizance of the significance of the visceral in some vocational contexts (Lahiff, 2014). As Felstead et al. (2005) have observed, the body, rather than the mind,

can be seen to guide expert practice with the development of a "sixth sense" in using equipment or tools to make adjustments to suit the process.

In summary, our conception of the development of expertise in vocational contexts confirms that it is a complex and complicated process, much of which is hidden, residing within the individual as personal expertise and within networks as shared knowledge. Vocational knowledge is similarly complex and complicated; it is constantly in motion, temporal, and with high levels of currency.

Researching the Development of Vocational Expertise

In developing our respective research projects, it was essential to ensure that our methodologies reflected the complexity of vocational teachers' practice. Although we adopted different conceptual frameworks, we shared key guiding principles in framing appropriate methodological approaches. The aim of this section is to draw upon the methodologies developed in our research to argue that it is incumbent upon researchers to develop robust, sophisticated methodologies to capture vocational practice in action in order to understand it and to place themselves in the contexts where vocational knowledge is shared and developed and where vocational expertise is honed.

Epistemologically, we were informed by discussions that emerged from contemporary developments in the realm of social theory. In her research on trainee teachers, Lahiff (2017) found that a realist perspective offered a helpful insight in preparing to research the nature of social reality in vocational classrooms. This was because, although teaching observations have long been seen as a means to evaluate teachers' practice, prevailing discourse had contributed to the implicit acceptance that a preexisting classroom reality existed that simply needed "to be seen." In contrast, a realist perspective accepted that social reality has human and nonhuman components and exists beyond the individuals who are involved at any point in time. Therefore, although we can identify the elements that may exist beyond individuals (i.e., "the relatively durable materials and practices, carrying cultures and social structures over time"; Parker, Mars, Ransome, & Stanworth, 2003, p. 179), we cannot, however, predict how they will come together at any moment. Emergence is the key concept here, where elements come together in unpredictable ways to produce an entirely new phenomenon, which is distinct from its constituent parts. A social realist standpoint was adopted because it recognizes that although vocational classrooms are indeed part of a material reality, what happens when vocational teaching takes place is emergent and the product of social interactions (Lahiff, 2014).

The starting point for the adoption of a specific methodological framing for Lahiff's research was the following quote from Miettinen (2000):

> Observation necessarily takes place in a certain activity, context or thought community, using the concepts, instruments and conventions historically developed in that context. They steer the observations, and with them the observer interprets and generalizes what is seen and regarded as problematic and important. (p. 63)

This led Lahiff to CHAT. CHAT emphasizes that any type of human activity takes place in a context and that the activity has a cultural, social, historical "memory." The focus of inquiry is on the purpose of the activity, as it will influence the way in which those involved in the activity approach it and use resources and artifacts designed for the purpose. The activity is the prime unit of analysis (Engeström, 2001). CHAT therefore provided a way of modeling and then theorizing the complex phenomenon of teaching observation and the situated nature of teacher development. Specifically, it offered a lens through which to view observation practices. Crucial to this modeling were the conceptual tools that CHAT provided. This meant that observations could be captured in action, having accepted the following: They were framed by rules and regulations; took place in specific communities; had specific participants (vocational teachers) and observers (education tutors and vocational mentors), defined as *subjects* in CHAT; and, significantly, involved specific observation artifacts, such as observation proformas and feedback discussions (Lahiff, 2014).

In her research on experienced vocational teachers, Broad adopted the material-semiotic approach of ANT. This also acknowledges the importance of recognizing both human and nonhuman actors within a relational network (see also Chapter 20, this volume). It offers a range of analytical tools to examine webs of relations between things in the locations where they generate effects. The epistemological insights afforded by ANT (a) establish that the reality we live with is one performed by a variety of practices and (b) make clear that there is no single, natural, or material reality. Reality for ANT is formed through action in the here and now, where performance is defined as "material processes [and] practices, which take place day by day and minute by minute" (Law & Singleton, 2005, p. 775). ANT, rather than offering theories as to why things happen, tells stories of how things come together in relations and attempts to offer explanations for the "messy practices of relationality and materiality of the world" (Law, 2007, p. 3). Therefore, it offers an alternative to the oversimplification of how teacher professional learning is contextualized and situated, and how it is developed and shared. It offers new insights into practice because, by adopting a commitment to relationality, it "makes it possible to explore strange and heterogeneous links and follow surprising actors to equally surprising places" (Law, 2007, p. 7). ANT therefore offered an alternative "starting point" from which to begin to follow the actions of teachers as they worked to develop their vocational expertise.

For Broad's research, the methodology was framed by ANT's roots in pragmatics, which, as Freeman has suggested, means it "takes place on the ground, as practitioners (including researchers and policy makers) talk and write about new ways of doing things" (Freeman, 2009, p. 440). A rallying call in ANT is therefore to "follow the actor" (see, inter alia, Callon, 1986; Latour, 2007; Mützel, 2009) wherever that may lead. Significantly, it invites researchers to "learn from the actors without imposing any a priori distinctions upon them" (Callon & Latour, 1981, p. 1). Similar to a grounded theory–informed approach (Glaser, 1992; Glaser & Strauss, 1967), this signals the imperative of approaching the research site with as blank a slate as possible.

Equally, the relational qualities of ANT were important when framing the methodology. As Strathern (1999) observes, ANT's distinctive offering is "in

overcoming the descriptive resistance to dealing even-handedly with persons, things, artefacts and so forth together" (p. 156). This approach to relationality and radical symmetry enables all aspects and components within a network to be analyzed, and thus all actors and entities—all the things that exert power—are followed. It decenters the human aspect of the network to enable the emergence of all things that hold influence on action. Therefore, actor webs always consist of both humans and nonhumans (Saldanha, 2003). This is unique to ANT, as other analytical approaches ignore the role of nonhuman things as they are viewed as being different from human things (Waltz, 2006).

Developing Expertise Through Teaching Observations

Although we approached our research from two theoretical perspectives, we both collected data through qualitative case studies of teachers in action. The first group, studied by Lahiff, comprised six trainee vocational teachers located in colleges of further education in the southeast of England. They were teaching the following vocational programs: catering, health and social care, specialist make-up (hairdressing for performing arts), and plastering and painting and decorating (for more details, see Lahiff, 2014). Vocational mentors and educational tutors observe teaching practice as part of the assessment of teacher training. Access to the teaching observation event and the subsequent feedback discussion between the vocational teacher and respective observer were agreed. This meant that Lahiff was in situ as the teaching observation process took place. Ethnographic observation was then followed by semistructured interviews focusing on the affective aspects of vocational teachers' and observers' experiences. Framed by a CHAT activity system heuristic, the interviews were used to place the activity subjects culturally and historically and to generate subjects' accounts of the purpose of the teaching observation—the object of the activity.

As a means to evaluate trainee teachers' pedagogic development, observations of teachers' practice in the UK have traditionally been modeled dualistically, with trainee teacher observations construed as being part of a developmental discourse (Lahiff, 2017; O'Leary, 2017). Despite this developmental positioning, few studies have either captured the nature of pedagogic development or focused specifically on vocational teachers' observation as they crossed boundaries from their respective vocational fields into teaching. In her research with vocational teachers, Lahiff (2014) concluded that two interacting types of development were evident with trainee observations: the development of pedagogic expertise, which was seen as the outcome of observations conducted with nonvocational observers; and the development of pedagogic expertise for vocational practice. In this chapter, the focus will be on the latter.

A common feature of the profile of the vocational teachers and their mentors was the length of time they had spent in their respective occupations prior to entering teaching. The average for both was 15 years. The centrality of vocational expertise is captured by Alan, the specialist make-up vocational teacher, who explained that his part-time teaching hours in a Performing Arts

department involved teaching across "specialist make-up for theatre" courses, where his vocational expertise in hairdressing, styling, and theater was particularly valued:

> In Specialist Make-up … it's not all the hair cutting, it's not the colouring, it's literally big hair, cage work, fashion hair … get it out, get it on, which for me is [brilliant]. I've always been interested in theatre.… I like looking into the historical context of performances … I've done some work at the ENO [English National Opera] … doing wig changes and stuff like that.

Vocational teachers' knowledge of vocational practice and experience in the occupational area was referenced frequently by their vocational mentor-observers as absolutely vital, not only in relation to the vocational students' learning, but also in structuring the expectations of the vocational learning environment. These expectations were integrated into vocational teachers' practice and were commented upon by vocational mentors as part and parcel of learning about the real world. This was the case irrespective of whether they were expressed in real-life stories told to students about kitchen codes of behavior or the problems of preparing hair on-set, or whether classroom practice modeled and/or challenged the banter of the construction site.

Entry into vocational teaching is often accidental (Lucas & Unwin, 2009). This was conveyed richly by Alan, who had been working as a technician in the hairdressing department in the college:

> My boss called me into the office and said, "We're really stuck for a teacher in hairdressing tonight, do you want to do some teaching?" I was thinking, "Shit," I'd never done any teaching before in my life, but I said, "Yeah alright then, I'll give it a go!" … Fortunately, it was the first year's practical lesson.… And then it just went on from there. And then I got more and more teaching hours.

Alan's comfort in accepting a teaching role reflected the vocational teachers' familiarity with the practical setting—the "mock" vocational environments replicated in colleges. However, the vocational teachers in this study felt particularly uneasy when faced with a nonpractical environment and/or when expected to teach vocational theory separately from the practice setting. Simona, the painting and decorating teacher, expressed this in the following way:

> In the beginning, I didn't know what to do in a classroom! I had mixed feelings about doing this.… In practical, it's not a problem. Everyone expects to be doing practical and you can get them engaged, but it comes as a surprise when they have to do theory. The practical comes easy because you are so used to it—to structure it, how you are going to start it. It comes naturally … you do it every day!

In this context, we can see how in the absence of familiar artifacts, tools of the trade, and vocational setting, the vocational learning environment is at once

stripped bare. It no longer resembles the wider vocational contexts the teachers have been used to. Aspects of vocational teachers' knowledge and expertise are lost, and opportunities for vocational teachers to draw upon the visceral in their work with students are at once removed.

Given the above, vocational teachers were generally observed teaching by vocational mentors in the practical setting in the first instance. The strength of the focus on the development of pedagogy, as opposed to the development of vocational expertise, is stated clearly by Vince, the plasterer's vocational mentor. When asked whether he would pass comment on a vocational teachers' vocational expertise in an observation, his answer was clear:

> I would never actually get involved with how he's doing the job… because I'm on the same level as him.… He's a tradesman already.… No, no, that would be too arrogant of me and I would never overstep that border. I might say, "That's a funny way of doing it, I've never actually thought about that." … No, I wouldn't find myself that arrogant that I'd actually tell him his job.

Learning Through the Observation Process: The Feedback Discussion

Vocational teachers outlined the expectations they had regarding feedback on the observation process. The catering teacher explained the expectations he had by using a cooking analogy:

> [W]hen I'm doing an observation [of students' practice in the kitchen]… if they were doing an assessment and they presented a dish, I would taste it for seasoning, taste it for flavour, taste it for texture, and then I would tell them if it was too salty, or not enough seasoning.

Vocational teachers welcomed both guidance from mentors on the ways in which specific teaching strategies might be introduced or developed based on the observed practice, and opportunities to discuss broader issues related to their practice. Clive, the plasterer, explains how, following observation feedback from his mentor, he reconsidered the ways in which he structured demonstrations of vocational practice:

> So what I've learnt to do is break down objects into bite-size pieces, "And this is how you handle the trowel, and this is how you put it on the wall," so you're actually building, like small building blocks. Because I can remember when I first, you know, took [students] through plasterboard work [I] just said … "Oh and you pick up a plasterboard," but then you realise that the plasterboard has to be placed right. So literally breaking everything down, almost like a script. I found myself going home and writing every single stage of what we're doing, because you just don't realise that you just do all this stuff.

Maria, the health and social care teacher, identifies her learning from observation feedback in relation to a range of pedagogical issues as follows:

> [I'm] learning [many] things: how to lay out the class; body language; not to have too high expectations; not to spoonfeed students … to challenge them.

In all the case studies, vocational teachers relished the opportunity to both discuss the observed teaching and consider how they could put ideas generated into practice. For them, the feedback discussion provided the context for development of this pedagogic expertise. They did not, however, expect discussions to be too cozy, as one vocational teacher remarked:

> [The observer] is not going to fluff around it because she likes you, do you know what I mean?… She's going to tell you how it is. And you want to do it for her because she's passionate about what she does. And my feedback was, well, to get that feedback from [the observer] in a year and a half is amazing.

Feedback discussions across most of the case studies reflected the specific challenges of planning teaching and learning in vocational contexts. This meant that, in the catering case study, strategies were shared with the vocational teacher to help catering students develop time-bound vocational practice. In preparation for the post-observation feedback discussion, Rachel, the catering vocational mentor, emphasized the importance of time-efficient practice in catering and why this aspect framed her discussions.

> When you go into industry, we haven't got half an hour to go around and collect our ingredients, the chef would be cursing, he'd be swearing at you and he'd go, "There's the door, goodbye!"

In the feedback discussion, she then shared the strategies she used in practice:

> You need a time clock, you need a time clock ticking away. "So you've got 15 minutes, here's the clock," this is how I teach them when I'm teaching it, when they just begin. I put it on the television [in the restaurant] and say, "You've got 20 minutes to do this task, at the 20 minutes we stop."

In the feedback discussion, reflections on the ways in which the vocational teacher developed sequencing in a skills demonstration enabled Rachel to praise the development of processes from previous observations:

> So that's good how [you] are doing that [demonstration] in small chunks, so that [you] are basically not asking too much of them, and then they can remember and [you] can go round and check their progress if they're unsure, you know, about cutting the meat, "Let's reinforce it, let me show you again," and then call them back once more.

The feedback discussion therefore offered opportunities not only to share strategies for the vocational context, but also to develop solutions to real challenges as experienced by vocational teachers. Each observation of practice presented different and often unanticipated opportunities to develop pedagogy around varied aspects of practice. In the process of discussing observed practice with their mentor-observers, vocational teachers can be seen to recontextualize (Guile, 2010) their pedagogic knowledge and understanding. The discussion opportunity can therefore be seen to illustrate the interrelationship of social practice and individual capacity in the development of expertise (Billett, 2001; Engeström, 2004; Felstead et al., 2005; Winch, 2010). As argued elsewhere (Lahiff, 2015, 2017), the feedback discussion acted as a verbal and developmental space where vocational teachers and observers use and develop the language of pedagogy. Vocational teachers and their respective observers were, to a greater or lesser extent, actively engaged in developing pedagogic expertise for vocational practice (Lahiff, 2014).

Examining How Vocational Teachers Maintain and Refresh Occupational Expertise

In Broad's research (for further details, see Broad, 2013), she began by surveying experienced vocational teachers to ask them how they continued to develop their expertise. A key theme that emerged was the centrality of professional associations in enabling teachers to refresh and develop their vocational expertise. She then interviewed and observed teachers from a range of vocational subject areas. Using ANT as a guide to the research approach, the aim was to trace the trajectories and map networks of teachers' engagement with activities. Two professional associations in the UK provided the initial focus for the research: the Association of Hairdressers and Therapists (AHT) and the Association of Painting Craft Teachers (APCT). As a former hairdressing teacher and member of AHT, Broad decided that following the AHT through participant observation would prove much more fruitful. She could enter relatively easily into their world because it was a world to which she once belonged. Within this world, she observed the teachers as they came together to provide opportunities for students to develop vocational skills and knowledge and to share practice.

A significant concern for vocational teachers is that, once they are removed from where vocational knowledge is developed and shared in and through practice, the development of their own expertise can stall for three reasons. First, vocational knowledge can be seen to be "in motion" (Broad, 2016). It is temporal in nature and requires constant movement and circulation. As they move away from their occupation, teachers are no longer part of this network of relations. Second, each teacher is uniquely situated in terms of their current level of expertise. This rests on how long they have been away from their industry or occupation and what CPD opportunities have been afforded since they became teachers. Third, teachers in this study explained that the colleges where they were employed

placed little importance on them maintaining their occupational expertise, as illustrated here by the early-years teacher:

> I don't think they are in the slightest bit interested once they have employed you. So they employ you for your subject expertise, but after that…

The construction teacher shed light on why this may be:

> But, it's not important to them, other things are and it's expensive. Like how would you go about maintaining subject specialism for carpenters and joiners? How would you go about facilitating that? You would have to get somebody in to show them a specific development and that's time, materials, money, space, all the rest of it you know and it starts adding up.

Therefore, each teacher will, by necessity, follow their own trajectory and often follow more than one pathway in pursuit of the development of vocational expertise.

Teachers act heterogeneously, and each follows a unique path of CPD, finding personal and professional value for themselves. These paths are multiplicitous: For example, the construction teacher explained how he spends much of his free time visiting museums in London: "For me it's not business, it's pleasure." He described his visits to the Victoria and Albert Museum to experience exhibitions on different furniture styles through history and said that these experiences are "incredible." A smaller, but equally fascinating museum for this teacher was the Geffrye Museum in East London that exhibits rooms of English interiors from different eras.

The experiences of the carpentry teacher also shed light on the temporal nature of vocational knowledge and subsequent issues for the development of expertise. For this teacher, much of his development centered on linking the historic and traditional with current and emergent trends. He had attended a course on making a Windsor chair and was extremely knowledgeable about the history of this chair, its place in English furniture making, and its connections back to the great furniture makers of the past, such as Chippendale. He said,

> I am really into my subject, I love it. I love chairs as well as it happens, I think they are fascinating things, they are you know, they hold up the body but you know, it's almost like a negative shape of the human body if you look at a chair.… England has a great history and culture of furniture making, like this particular chair and it's the Windsor chair and the development of that is just fascinating you know, it's not held together with any glue, there's steam bending involved, bending of the wood, shaping of the solid components and it takes a lot of knowledge to prepare this particular chair.

Developing Expertise Through Sharing With Others

Teachers seek out ways of engaging with others to share practice and use this to develop their vocational expertise. The following examples show how teachers share vocational knowledge and expertise with teaching colleagues within their

own work contexts. First, a hairdressing teacher explained how teachers came together at the end of the teaching day to share practice of new techniques and products. One example used a cascade model of learning based on one teacher's attendance at a product training course:

> For example on Friday when we finished, … we did CPD training on a new treatment that has just come out. One of the other teachers had gone on the course and showed us what she had learnt.

This teacher offered a further example of learning mediated through and with others by learning alongside students. Events are organized by teachers for their students in which external speakers, such as product or equipment manufacturers, provide training on products and tools:

> We get outside agencies in, … we had a demonstration from Babyliss [electrical hairdressing tool manufacturer], we have Wella [hairdressing product manufacturer] coming in to do product knowledge talks. Erm, we have just switched over to L'Oreal [hairdressing product manufacturer] products, so we had L'Oreal coming in.

The process of learning mediated through colleagues was also described by the carpentry teacher. He explained how new teachers often share fresh and current occupational expertise with more established teachers. This collaborative process is a direct contrast to Lave and Wenger's (1991) initially simplistic notions of the journey from novice to expert, from peripheral to full participation (see also Fuller & Unwin, 2005; Fuller et al., 2005). In the two examples provided by the carpentry teacher, a more complex multidirectional movement enables occupational knowledge to circulate through novice teachers and appears to be a relatively common method of development for vocational teachers. In the first example, he employed a technique learned while working as a cabinet maker, which enabled him to take technical shortcuts with veneer work. He explained how this was shared with colleagues:

> So it just happened one day that I was actually making draws [with students] and he [another teacher] was coming through the workshop and he was 'What are you doing?' I said, 'This is a good time, we are making draws'.… But flipped it over, put the glue in and with the Sellotape, all the sides just snapped together and to cut a long story short, it makes a complex process incredibly easy. One person can do it and there's no big usage of cramps and he looked at it and said, 'That's pretty good.'

He also relayed how he shared his experience of computer design, learned in industry with colleagues:

> I was telling [named two colleagues] about that particular class and what we were doing … they were quite curious about it so they came up into the class and er, watched what I was doing and that's CPD. And as we spoke about it later, that's probably the best CPD we had done in a long time.

The following set of examples show how teachers cross boundaries through professional associations and highlight both the benefits these afford and the importance placed on these by teachers. Professional associations provide opportunities for teachers to share emergent trends from within the occupation, as one AHT hairdressing teacher explained:

> Our industry is based upon the lines of fashion and there are always changes, and there are the new awards that they are bringing out. New treatments. They might not be established, but as they become more widespread through the industry they become more established.

The professional associations enable teachers to network across organizational boundaries with other teachers. Another AHT teacher said,

> You network with all the different colleges up and down the country and you get to know so many people.

The central significance of the process of sharing in collaborative networks that met in particular contexts was a common theme emerging as a key benefit of belonging to a professional association. An AHT hairdressing teacher explained these benefits and processes:

> You can talk to people and when you talk to them you find out that they have the same problems as you have.

Another AHT hairdressing teacher explained this as follows:

> Just talking to people you pick up ideas and often some of the things that they have changed, you think, I could go along with this.

And yet another comment was:

> The more people you are, that are talking to each other, you can advise and share with each other.

Codifying and Transporting Vocational Knowledge and Expertise

Professional associations afford teachers a unique opportunity to both network with others and capture vocational knowledge and expertise for transportation back to their classrooms and workshops. As discussed in this chapter, the nature of vocational knowledge means that it resists codification (Livingstone & Guile, 2012) and thus presents significant challenges for teachers in capturing current trends and approaches to use with students in classroom and workshop settings. For many teachers, an important aspect of developing their occupational expertise was to capture action through taking photographs. This enabled them to transport new vocational knowledge from contexts where it was developed,

and was used in two ways: first, to act as an aide memoire and future reference; and, second, to be used with students in teaching contexts.

An example of the use of photographs can be seen in the practices of hairdressing teachers who organize student competitions. These competitions afford teachers ways of keeping up-to-date with current trends, as one AHT hairdressing teacher explained:

> You see the changes and the styles changing and the fashions and the colour trends coming through.

He explained the use of a camera to capture how these latest trends were being used by teachers and their students from other colleges. Another AHT teacher described watching a particular competition where one student used the very traditional technique of "fingerwaving." This was described as a well-known hairdressing procedure, introduced in the 1920s, and part of the current hairdressing curriculum. It is, however, a very difficult technique to master. The student competitor used special clamps and tools to enable her to carry out the procedure. The teacher commented,

> I've not seen that tool used in that way before. So I've taken some photographs and I'm going to go and get that tool when I get back.

As discussed earlier in the chapter, vocational expertise and knowledge are both tacit (Eraut, Alderton, Cole, & Senker, 2000) and situated within context (Fox, 2000). Hence, these photographs become an easy way of recording action in the here and now. They become shorthand accounts of action, captured and made concrete. They thus allow for specialized techniques to be transported to other contexts. The use of photographs for capturing vocational knowledge directly from the occupational context was employed by the applied sciences teacher to enhance student learning:

> Oh my patients are always cropping up in my lectures. They pop up all over.… I take an awful lot of pictures … when they have got interesting problems and bits and pieces.

This section has presented findings from the research project on vocational teachers' CPD that demonstrate the myriad ways in which they work with others to access vocational knowledge in order to refresh and maintain their occupational expertise. The following section draws together the findings from both research projects and presents emerging themes in the development of vocational teachers' expertise.

Discussion

By drawing on our respective research projects, this chapter set out to explore the ways in which vocational teachers develop their expertise. Our studies have confirmed that, through the use of both in-depth interviews and ethnographic

observation and by "following the teacher," we have been able to make visible the practices of vocational teachers as they develop their pedagogic and vocational expertise. This is in full recognition of the argument that much vocational knowledge is tacit and therefore problematic to view. In this section, we draw together some common elements that connect our empirical research. Our argument is that they are important factors both in the development of vocational teachers' expertise and in capturing the processes involved. The elements are (a) the significance of artifacts, (b) the centrality of tacit and visceral dimensions, (c) the agency of vocational teachers, and (d) the mediating role of others in developing expertise.

Artifacts

In both studies, artifacts and other network effects were central to understanding the ways in which vocational teachers develop expertise. In the teaching observation activity, artifacts were construed as part of the activity heuristic's conceptual toolbox. Artifacts in this analysis were not considered in relation to their physical form or their content; rather, how these artifacts were seen to operate in the activity was the subject of consideration. As Ellis, Edwards, and Smagorinsky (2010) remind us,

> [T]ool-use reveals something about the cultures within which the tools have developed as well as the thinking of those who work with them and, further, highlights the relationship between these two, social and historical processes. (p. 18)

Artifacts therefore have been understood in terms of their mediating role in moving the activity toward the object or goal. In CHAT terms, the feedback discussion is positioned as artifact. In the case study extracts provided, we have shown how the artifact mediates learning and moves the activity toward the object of activity. However, artifacts in the vocational classroom have significance beyond this modeling. Vocational teachers, metaphorically, feel at home because of these artifacts; they position the vocational teachers (Lahiff, 2014). This is because the artifacts in question are the ovens, knives, and uniforms; the hairdryers; and the trowels and paintbrushes that represent the workplace. They are at once tools of the trade and artifacts in an activity. As tools of the trade, they "carry over" their practical and symbolic meaning.

For vocational teachers, artifacts were also central in refreshing and updating occupational vocational expertise. Artifacts, normally in pictorial form, were used to codify and transport vocational knowledge and expertise from the site where it was captured to classrooms and workshops to use with students, with teachers reformulating vocational knowledge from a productive to a learning function (Moodie & Wheelahan, 2012). Within ANT, these can be understood as inscription devices, a distinct form of actor within a performative network. The concept of inscription devices was developed by Latour (1987), who defined it as "a visual display of any sort of scientific text" (p. 68). He described it as a semiotic representation of laboratory work, which serves as a junction between two

worlds by presenting to one a visual representation of the other. In an example given by Latour (1987), a particular laboratory instrument, a physiograph, produces a raw image, a representation of some scientific findings. This raw image has thus been enacted into being within the laboratory. It then becomes a figure within a scientific journal, and through this journey it becomes an inscription device, a shorthand diagrammatic account of laboratory work, which can connect to other worlds and spaces. It has become a looking glass, enabling the reader of a scientific journal to see into the laboratory.

For the vocational teachers, artifacts also serve as a shorthand representation of one world to another. They enable teachers to capture vocational knowledge as it is developed in practice, make shorthand versions of this knowledge, and move it to other contexts, thus recontextualized into a learning function.

The Tacit and the Visceral Dimension

Our research has confirmed the importance of the visual in accessing and capturing vocational knowledge and expertise through the use of photographs. Additionally, we stress the importance of all the senses in vocational contexts and, significantly, in the development of expertise for vocational teachers. With respect to the development of pedagogic expertise, the sounds and smells of the workplace can be seen to shape the experience of practice, including the verbal encounters and physical relationships with learners. In their practical contexts, vocational teachers help learners to get to know the feel, smell, and/or sound of artifacts so that they may best develop their own vocational practice in the workplace. However, as we have shown with respect to practice, in some case study contexts, theory and practice are separated. We argue that this is a spurious separation.

With regard to teachers' CPD, we have shown that it is the tacit and visceral nature of vocational knowledge and expertise that ensures its complexity and heterogeneity. Teachers follow their own pathways and engage with a variety of networks in the pursuit of new vocational knowledge. The ANT analysis provided here shows its development as a network effect, rather than a codified product, and it is encapsulated as "ways of being, ways of acting, ways of feeling, ways of interacting, ways of representing, as well as ways of knowing" (Fenwick & Edwards, 2013, p. 52). Thus, conceptualized as network effects, it becomes clear why not all forms of knowledge can be easily seen, identified, and codified.

Agency of Vocational Teachers

In both research contexts, we found that the agentic actions of vocational teachers and those with whom they shared experiences, whether in the teaching observation activity or in the networked web of relations that form CPD opportunities, were key aspects in the development of expertise. In Lahiff's work, the CHAT framework enabled subjects in the teaching observation activity systems to be seen as taking action to move the activity toward the object of activity, to use and/or adapt artifacts in the activity and negotiate the rules that underpin the activity. Equally, Broad's work demonstrated that teachers act heterogeneously, each following their own particular path in the development of their

vocational expertise. In addition, due to the complexity of vocational knowledge and expertise, they follow paths that are multiplicitous, developing their expertise through varying mechanisms, carried out concurrently. These paths are chosen individually by the teacher so as to provide the most fruitful experiences that afford opportunities to develop the nuanced aspects of practice they have self-identified.

Mediation

In both of our studies, expertise was shown to be developed in practice with others, both internal and external to the vocational college context. Given our conceptualization of vocational expertise as distributed and social, rather than solely residing in the head of individuals, this in itself is not unexpected. However, our contribution has been to make visible the form that mediation takes, and, although the forms differ, the signficance in the development of expertise is confirmed. With teaching observations, making visible the post-observation feedback discussion and identifying it as a mediated learning process, we have shown how the discussion provided the verbal space for the development of pedagogic expertise for vocational practice. The development, mediated by vocational mentors who engaged in discussions of practice, guided vocational teachers' pedagogic development through the vocational lens.

With CPD activities, the concept of mediated practice was shown as emerging from action and actors within networks. The significant aspect of this, as shown by the radical symmetry approach of ANT, is that these networks were made up of both human and nonhuman actors, and, through taking account of the actions and interplay of all actors within a network, the ways in which vocational knowledge is developed and shared are illuminated. ANT has allowed us to see that professional vocational knowledge is developed through a web of relations and interactions that are not context-free. A network will only remain stable if all actors, both human and nonhuman, remain faithful to that network (Whittle & Spicer, 2008). It is through continually negotiating and renegotiating links between the actors, through a high level of engagement through these activities, which enables a network to become stable.

Concluding Remarks

This chapter has shed light on the ways in which vocational teachers' expertise is developed in and through practice. We began by conceptualizing vocational expertise and argued that identifying and capturing its complexity present challenges for the researcher. However, with judicious and careful selection of approaches, we have shown how the tacit and everyday development of vocational practice can be made visible. We have argued that utilizing ethnographic observations of vocational teachers in situ and engaging in discussions provided opportunities to capture the various ways in which vocational teachers develop their pedagogic and vocational expertise. Additionally, we argued that in researching teachers' developing practice, the professional expertise of the

researcher was central—in both our cases, we were familiar with the practices we set out to research. This enabled not only access but also understanding of the respective research sites, and enhanced credibility with the participants. We argue that this allowed for more detailed and rich research data to be revealed and captured by us.

The chapter also set out to inform ways of thinking in relation to supporting the development of vocational teachers' expertise. From our research, we argue that it is incumbent on VET policymakers to appreciate the complexity that underpins the development of the dual professional. Rather than restricting the time taken to develop pedagogic expertise with others and/or predefining CPD for vocational teachers, mechanisms that enable vocational teachers to share and develop practice with others will afford greater opportunities and, ultimately, ensure a more meaningful vocational learning experience for students.

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Part V

Challenges for VET

23

The Challenges VET Faces Through Its Intersection With Social Class, Gender, Ethnicity, and Race

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Introduction

Traditional patterns of social and economic life have been disturbed and disrupted, but not dissolved, by the globalizing shifts of late modernity. Communications technologies continue to transform the ways in which people relate to social and educational institutions. In these contexts, many of the challenges faced by vocational education and training (VET) stem from disconnects between the system worlds of educational and labor market change and the realities of the socially positioned lives people lead.

   In international policy debates, the part VET can play in the mobilization of talents, the drive for upskilling, and the reduction of risks of social exclusion are familiar, dominant themes. VET is positioned as pivotal to the realization of economic and social justice goals, in its role of equipping people with the capabilities required for work entry and working life (Mulder & Winterton, 2016; see also Chapter 7, this volume). This "system-world" lens can be complemented by a "life-world" lens, which offers a richer field of vision in which the bounds on human strivings and aspirations are recognized, along with the means sought to realize broader and fairer modes of participation. The combination of lenses stimulates a fundamental rethinking of the dynamics of work, learning, achievement, and responsibility in society, within VET, and beyond. We need to recognize more readily how the social processes associated with gender, ethnicity, and social class are manifested in VET and how these processes are mediated by the structural, cultural, institutional, and labor market formations in which they are embedded. Understanding how VET constitutes part of the problem as well as potential solution should lead to a more realistic appraisal of the scope for VET to make a difference.

Consideration of the challenges VET faces through its intersection with social class, gender, and race brings together two analytic perspectives. The first perspective focuses on the social organization of learning. The second perspective focuses on the learning individual and the socially positioned lives people lead. VET, as is the case with all elements of an education system, is constantly challenged by adjustments to changed conditions in work and society and the need to address dysfunctionality in existing forms of educational provision, the need to respond to demands to create new pathways into working life or strengthen existing pathways, and the challenges of creating incentives and improving quality while ensuring inclusivity, equality of opportunity, and flexibility. Recognition of the prior and informal learning of adults is now routinely demanded in VET systems, which recognize the workplace and community as significant settings for learning. The second analytical perspective examines the conditions and opportunities that the changing social organization of VET presents for people as "social actors": the social structuring of the life course and the accumulation of risk and inequalities. At the same time, it keeps in view personal agency, reflexivity in learning, the significance of social networks, and the transformative and socially reproductive potential of interlinked social relationships.

An examination of the patterns produced when individuals navigate socially organized learning reveals that VET often entrenches inequalities (Allen & Ainley, 2013; Brown, Lauder, & Ashton, 2011; Taylor, Hamm, & Raykpv, 2015). Social inequalities are revealed in the patterns of engagement in work and learning, as vocational education pathways continue to be associated with "low esteem" in many societies (Brown et al., 2011; Jørgensen, 2015). The inequalities in career outcomes consistently identified by large-scale panel survey research (such as the UK Longitudinal Studies and the German NEP) are shown to have structural foundations in gender, ethnicity, and social class (Schoon & Silbereisen, 2009; Schuller et al., 2001). Research that focuses wholly or partially on VET confirms the enduring challenges of inequalities and classed, gendered, and racialized processes in VET participation and progression (Brown et al., 2011; Chadderton & Wischmann, 2014; Deissinger, 2015; Jørgensen, 2015; Müller, 2014; Niemeyer & Colley, 2015; Virolainen, 2014).

At the same time, the social organization of VET creates spaces in which educators can challenge inequalities (Beck, Fuller, & Unwin, 2006; Evans, 2006, Jørgensen, 2015; Onsando & Billett, 2017). The social landscapes in which people live their lives and in which different configurations of VET develop profoundly influence the opportunities afforded by VET for young people and adults. Although this applies at a systemic level, studies conducted in selected localities can reveal the variations within systems that occur when socioeconomic, cultural, and demographic features combine in different ways. The evidence of enduring social inequalities and polarizing social processes identified by large-scale surveys requires deeper exploration when connected to the life-world voices and purposeful activities of people moving in their various, highly differentiated social landscapes. This is because survey or observatory research at national and transnational levels rarely offers convincing accounts of localized social and cultural variations or recognizes how changes in the social landscape can be linked to the contextualized exercise of human agency. The analysis of

empirical encounters in a range of institutional settings can shed new light on questions about agency and the beliefs people have about their abilities to control their lives. This process can explore the intersections of gender, ethnicity, and class, showing how what people believe is possible for them (i.e., their personal horizons developed within cultural and structural influences) influences their behaviors and what they perceive to be "choices" (Colley, James, Tedder, & Diment, 2003; see also Chapter 11, this volume).

This chapter takes, as its point of departure, the evidence and insights yielded by a family of empirically based inquiries into the life and work transitions of young people and adults that began with studies funded by the Anglo-German Foundation and the UK's Economic and Social Research Council (ESRC) undertaken in contrasting cities and regions between 1988 and 2002. The insights from these studies were subsequently elaborated through European Socio-Economic Framework research into gender and qualifications in VET and collaborative European-wide studies of pre-VET and VET participation among socially and economically disadvantaged young people and adults. These studies have illustrated how international, national, and local contexts have to be kept in view in considering what inequalities mean for VET participants and provide a benchmark for review for new research that is producing evidence and insights into changing patterns and perceptions of inequality in the early twenty-first century.

Understanding Inequalities Through a Comparative Life Transitions Approach

It is well recognized that structural factors of class position, gender, and ethnicity are reflected in the ways people construct their sense of self and the ways in which they behave in relation to educational institutions and labor markets (Tomlinson, 2013). A retrospective review of the comparative exploration of the life and work transitions of young adults reveals landscapes of higher and vocational education and shifting job opportunities that are themselves reflexively bound to social structures and political economies of learning and skills.

The Anglo-German survey evidence drawn on throughout this chapter had foundations in earlier comparative studies that focused on the shaping of careers and "routes" into the labor market in contrasting areas within Germany and England. Two areas characterized by high unemployment and decline of traditional industries (Bremen and Liverpool) were compared with each other and with towns that had expanding economies founded on growing industries (Paderborn and Swindon) in an initial study called *Youth and Work: Transitions to Employment in England and Germany* (Bynner & Roberts, 1991). This focused on how entry to work was achieved by young people. Transition behaviors, as important elements of the young people's personal histories and career outcomes, were core themes in the successor study called *Becoming Adults in England and Germany* (Evans & Heinz, 1994). The term *transition behaviors* referred to the patterns of activity that people adopt in attempting to realize their personal interests and occupational goals within social frameworks and

structural opportunities. These transition behaviors were seen as a more or less adequate set of solutions to problems that started with educational achievement, vocational choice, looking for a training place, applying for jobs, and maintaining one's place in the labor market.

Transition behavior can change in the case of failing to achieve the intended result at any stage of the process, and it can be linked with career trajectories.

Four broad trajectories satisfied the conditions of comparability between the countries: (a) the academic mainstream leading toward higher education; (b) training and education leading to skilled employment; (c) other forms of education and training leading typically to semiskilled employment; and (d) early labor market experience of unskilled jobs, unemployment, and "remedial" training schemes. Four transition behaviors were labeled: *strategic, step-by-step, taking chances*, and *wait and see* behaviors. These were activity patterns that young people tended to adopt when moving along trajectories into the labor markets.

In each of the geographical areas selected for study, young people from poorer socioeconomic backgrounds were disproportionately represented among those who were unemployed or in precarious situations, that is, in trajectories (c) and (d). They experienced little sense of control over their own situation. Labor market conditions and the resources available to them affected the sense that young adults had as to the extent structural or individual factors influence life opportunities. A belief in how open opportunities are for everybody played an important role in young adults' assessments of opportunities and of control of their lives. At the time of the original research, carried out between 1988 and 1994, young people in England were much more likely than their German counterparts to be in the "lower" two trajectories. In the later 1990s, the comparative studies in three new areas were extended to include a city in eastern Germany (Evans, Behrens, & Kaluza, 2000). At this time, young people in Germany were increasingly caught in a double bind: a hostile labor market that effectively excluded unqualified young people, but that could no longer sustain the training routes and social support previously provided for the large majority. The striving for work identities, so strongly fostered by German culture and tradition, did not diminish, and there was evidence of growing frustration among marginalized and excluded youth (Diewald, 2000). There was, at the same time, a growth in casualized work opportunities available for unqualified adults, producing a situation that portended the growth of precarious work opportunities that developed over the next decade. Ways into the labor market were becoming diversified and more dependent on displaying the characteristics employers say they want, as well as qualifications. These trends were most marked in the eastern German states (Länder) after the political changes of 1989, but signaled wider trends throughout the Federal Republic of Germany.

The combined evidence from the Anglo-German family of studies showed that the active transition behaviors much advocated for youth, from active job search to mobility and taking chances, had mixed results. Young people take calculated risks, but under very different individual pressures and circumstances. Decision making is shown to be relative to their personal horizons and the subjectively perceived range of education and employment options available to them. Although these decisions are not in any way determined by social class, gender,
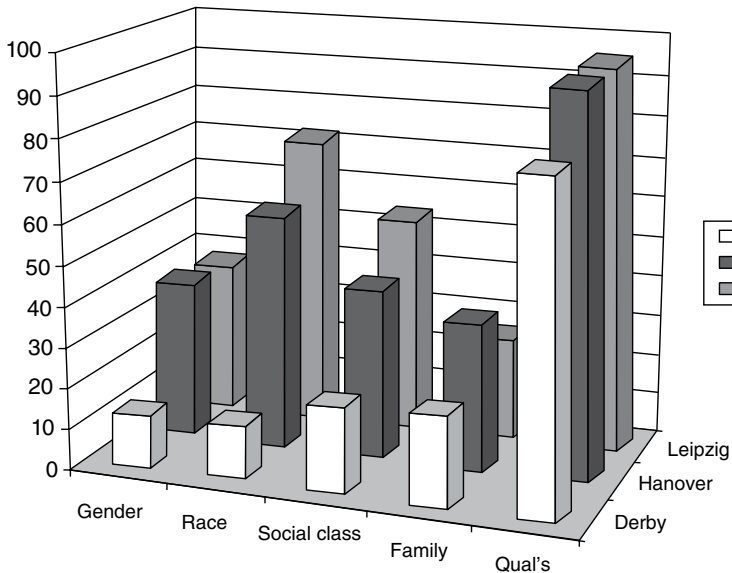
Figure 23.1 Numbers rating social characteristics as "of considerable importance" in affecting life opportunities (*n* = 300 in each city).

or ethnicity, nor by the dynamics of the labor market, they have structural foundations that are manifested in life experiences and destinations in primary and secondary labor markets.

Figure 23.1 shows the broad pattern of results when perceptions of comparable samples of 18–25-year-olds in three selected cities (Derby, UK; Hanover in western Germany; and Leipzig in eastern Germany) were asked, between 1999 and 2000, for their views on the relative importance of gender, social class, and ethnicity in influencing life's opportunities. A higher proportion of German respondents stressed the importance of all the structural factors—social class, gender, and race or nationality—than their English counterparts. However, to put this into perspective, both the English and German young people perceived educational qualifications as considerably more important in determining their life chances than any of the social characteristics the researchers asked about. Views on the importance of social class varied markedly between settings, although views on "race" varied markedly according to ethnicity and locality, as expected. Just over one half of ethnic minority respondents to the survey in the English city thought that race had a considerable effect on shaping life chances.

Comparison of these findings with those from research carried out by the ESRC-funded Center for Learning and Life Chances in Knowledge Economies and Societies (LLAKES) based at the UCL Institute of Education in London between 2013 and 2016 among British youth, using questionnaire survey and interview methods, shows remarkable continuities and some significant changes. The remainder of this section explores further evidence of shared experiences of gender, race, and social class, and their implications for VET institutions that can play a role in mediating them.

Shared Experiences of Gender

The 1998–2000 surveys of young people in comparable labor markets in England and Germany showed how many young people, particularly young men, believed the effects of gender in life chances were outweighed in importance by the effects of educational qualifications, effort, and performance. Although the German young people saw gender as more of a barrier than the English, both viewed gender as less important for life opportunities than educational level and qualification (Figure 23.1). There was awareness that particular sectors of the labor market continue to be viewed as more suitable for males or females. Beyond this, more subtle forms of sexism were seen to be operating, such as people being stereotyped by the way they look and women having to perform better than men in order to gain an equal degree of respect. There were frequent references to "competence" overriding other factors, but within an overall awareness of a degree of unfairness operating in the levels and status achieved by females and males in employment and the economy.

The ways in which people experience the effects of gender in their personal lives depend to a large extent on their position in the social landscape, where gender, social class, and ethnicity intersect. Yet young adults trying to exercise control over their lives in the contrasting labor markets of English and German cities had important experiences in common: men's advantages in the labor market, despite the high educational performance of young women; the continuing pressures on women to prove themselves; and the challenges of tackling "nontraditional" roles typically dominated by men or women. In a 2015 LLAKES study, interviews with young people in Britain contained some common questions that have yielded responses that can be compared with responses of young people in survey and interview responses in the 1998 English samples (Franceschelli & Keating, 2018). The analysis suggests that these experiences and perceptions of gender have not shifted far in the intervening 15 years for comparable samples of young people in England. Most young people in the 2015 survey thought that getting ahead in life depended mainly on hard work and educational qualifications.

The challenges that these pervasive and enduring experiences pose for VET were captured in the Gender and Qualification study carried out in five European countries (Finland, Germany, Portugal, Greece, and the UK) in the early 2000s (Heidegger et al., 2004). The research explored the VET experiences of young men who had started vocational courses in nursery work and young women who had signed up for electrician courses. Their experiences were compared with young people who had entered catering and food service occupations, which tend to attract approximately equal numbers of men and women. Entering atypical training and employment, for both women and men, was shown to require particular resilience and much determination. People who entered training for gender-atypical occupations often left it early. Those who stayed the course in atypical occupational situations often struggled to find ways to assert their gender identity.

The study showed that autonomy of choice by young people is often assumed and claimed by trainers in VET institutions. The research found that educators

in these VET institutions often saw gender as an issue of the past, with barriers largely overcome as the participation rates of young women in full-time post-school education have increased to levels above those of young men. They often viewed gender as an irrelevance, as they felt they treated everyone as an individual. Yet, as argued elsewhere (Evans, 2006), gender barriers can only be considered to have been overcome when individuals can choose jobs and career paths (whether in paid or unpaid occupations, or a mixture of the two) according to their preferences, without gender-related penalty or disadvantage accruing from that choice. The evidence from the European study showed that this was manifestly not the case. Having to exercise particular resilience to withstand or overcome inappropriate behavior or gender-related prejudices in a course or workplace constitutes a gender-based disadvantage. Furthermore, when signing up to a gender-typical occupation also means signing up to low pay relative to skill level, a gender-related penalty ensues. Young women who made gender-typical choices and young men who made gender-atypical choices (e.g., nursery work) experienced these gendered penalties.

Autonomy of choice cannot be used to exempt educators from responsibility. Critical evaluation of choices has to be actively supported, so that both gender-typical and gender-atypical preferences are entered into with information and resources when challenges are faced. Supporting the informed exercise of the preferences that lead to the functioning that people want to achieve means challenging and reducing gender-based penalties, as an alternative (or at least complementary) strategy to seeking ways of equalizing the numbers of people according to gender in each occupation. This does not lead to a deficit model conclusion that people should become more resilient and determined to succeed, while the barriers they face remain untackled. It leads instead to some insights, elaborated in Evans (2006), into the kinds of support needed for people who want to exercise their preferences by going into atypical fields, while enabling the many women and men who want to do so to exercise gender-typical preferences with the support necessary to challenge gender-based pay or promotion penalties and unfair advantages. As Beck et al. (2006) have argued, generating a greater awareness among young people of the risks in entering gender-typical occupations (including low pay, low status, and "bumping along" with little earnings progression) is one element for which VET educators and guidance professionals could take responsibility.

The social forces that combine to keep barriers in place take much longer to change, but influences can be exerted by practitioners in gendered occupational and career arenas and by the large numbers of adults and young people whose learning they facilitate. The spaces for challenging and changing practices at the level of intermediary organizations, particularly those providing VET, are often underestimated. Practitioners need support in understanding better how the social practices of VET facilitate or impede learning and the confidence to change them. Breaking out of the straitjacket of managed approaches of the present systems-world will not be achieved quickly, but it is at this level that individual strivings and practitioner commitment can combine.

Changes can be achieved in the practices of VET institutions to accommodate people's preferences and counter the barriers and penalties they face in taking

their desired paths in life. However, a special issue of the *Journal of Vocational Education and Training*, published in 2015, has underlined the enduring nature of the challenges. Pointing to the relatively few papers on gender submitted for publication in the past 10 years, the editors noted a lack of appetite for advancing the study of gender in VET, which they ascribed to a perception that the problems are intractable and have already been well enough documented.

The exercise of social responsibility by those who participate in VET, whether as students, teachers, trainers, or supervisors, will not have immediate influences on the social forces and factors that produce gender-based disadvantages. It will, however, promote awareness, cooperation, and action that can feed into the longer term pursuit of macrolevel changes in the "framework conditions" of society. These can be worked toward, collectively, through social movements, which, in the cause of gender relations and gender equity, have proved particularly effective and sustainable over time. Where individual strivings, practitioner responses, and social action combine, the exercise of social responsibilities at these different levels of society promises to reduce, incrementally, the penalties (social, economic, and emotional) for those who choose to enter occupations in which their gender is underrepresented. Furthermore, a new analysis is showing that the inequality component of gender segregation is much smaller than expected. In employment, men are shown to have the advantage on the vertical component of pay, whereas in class status the advantage is held to lie most often with women (Blackburn, Jarman, & Racko, 2016).

Shared Perspectives on Race, Ethnicity, and Nationality

The young people interviewed in the 1998–2000 Anglo-German surveys generally had less to say on the topic of race than gender and gave fewer examples. The findings shown in Figure 23.1, although they are illuminating in general terms, mask the fact that 53% of ethnic minority respondents in the English city thought that race had a considerable effect in shaping life chances (compared to 17% of the nonminority respondents) and 30% thought that gender had a considerable effect (compared to 18% nonminority respondents). Young people participating in the research had rather less to say on the topic of race than gender, and gave fewer examples, except in the eastern German city, where responses reflected the high proportions who perceived race to be important in life chances. Issues of nationality aroused strong feelings in the eastern part of Germany, despite the relatively low levels of migration affecting the state. The accession of East Germany to the Federal Republic was undoubtedly a factor, and the findings reflected concerns about growing so-called xenophobia in the media coverage of the time. That is not to say that the attitudes were themselves primarily xenophobic. The attitudes expressed in the 1998–2000 study recognized that non-Germans suffer particular forms of overt discrimination and that this fundamentally affects life chances. Comparing the English sample's attitudes with the findings from the 2016 LLAKES research is telling. Franceschelli and Keating (2018) have noted that a "turn to the self" in the wider population of young people has translated, in some cases, into a turn against others, with visible minorities blamed for personal predicaments.

The social inequalities of ethnicity are underresearched in the VET field. As Atkins and Avis (2017) and Avis, Orr, and Warmington (2017) note, studies of disengagement and unemployment give some limited recognition to ethnicity, whereas questions of race and racism have been largely sidestepped in the English language literature. This appraisal is consistent with Chadderton and Wischmann's (2014) comparative analysis of research evidence in the field. Their study is particularly pertinent, as it compares apprenticeship systems in England and Germany from the perspective of the underrepresentation of young people from ethnic/migrant backgrounds. Multiple reasons for this underrepresentation are identified, ranging from the choice of more academic routes, parental pressures to get academic degrees, underachievement in school, and lack of the networks and contacts that facilitate entry to quality apprenticeships.

More fundamentally, Chadderton and Wischmann (2014) discuss the propositions of critical race theorists such as Gillborn (2006), who challenge dominant beliefs in the inherent fairness of educational systems and argue that racialized norms prevail. The approach problematizes the notion that young people from different ethnic groups aspire freely to different forms of postschool education, because these assumptions mask the racial structures that contribute to these aspirations. Underachievement in education also has to be approached critically, because in Germany, the tracked, segregated nature of the system results in fewer young people from migrant backgrounds entering the Gymnasium and getting the opportunity to do the Abitur (which is required for access to higher education). Although it can be argued that young people from some minorities prefer to go to higher education to doing an apprenticeship, Chadderton and Wischmann (2014) argue that the evidence shows they are underrepresented in both. This differs from England, where ethnic minority young people continue in full-time education to a greater extent than white young people. However, in England, the increase in take-up of apprenticeships among young people from minority ethnic groups is not reflected in the statistics for completions because they are more likely not to complete. Those who do complete are less likely to progress to a job (NAS, 2009).

There are, of course, considerable variations in underrepresentation in both higher education and VET according to ethnicity, with visible minorities designated as *minority ethnic* and the majority group referred to as *white*. As Avis et al. (2017) have also shown, the group most underrepresented is black males aged 16–24, who also are most likely to be unemployed and also steered toward low-level, transitory courses and the consequent labor market "churn." In Germany, despite the evidence that minority ethnic young people are often assigned to problem classes in school and are unfairly treated, the policy emphasis has continued to be placed on the disadvantages of the children of guest workers and ethnic workers from the Soviet Union who were born outside Germany, but who hold German citizenship. The majority group is referred to as German. As was apparent in the views of young people reported at the start of this section, the debate in Germany rotates around "nationality," whereas the debate in England rotates around "race." Immigration has increased in both Germany and England, but, unlike gender in Germany and social class in England, ethnicity has not

generally been given sufficient attention as a definer of success, according to Chadderton and Wischmann (2014).

In England, one study (Ecotec, 2009) proposes that it is discrimination and resistance that shape young people's decisions not to apply for apprenticeships in England, not least because they are associated with low-status and unreliable progression routes. But Chadderton and Wischmann (2014) mount strong arguments to the effect that racialized normative images of the worker prevail in both countries and that these "shape to some extent both the labor markets and the vocational training systems" (p. 134). Racialized norms operate through the perceptions of managers, educators and trainers, and, often, young people themselves. A widely held view of young people as individuals making their choices "freely" in this context has to be challenged, according to Chadderton and Wischmann (2014), in an argument that resonates with the discussion of gender in the "Shared Experiences of Gender" section.

It was noted earlier in this chapter that an examination of the patterns produced when individuals navigate socially organized learning reveals that VET often entrenches inequalities. The growing body of research on VET, race, and ethnicity is revealing the social processes that produce these outcomes. At the same time, the social organization of VET creates spaces in which educators can challenge inequalities and influence change processes. This is an equally important focus for research. Onsando and Billett (2017) focus tellingly on the spaces that VET might offer for challenges to racism and racial discrimination in Australian vocational colleges (known as technical and further education [TAFE] institutes). Proposing an antiracist framework to "buttress" the students against their experiences of racial discrimination at TAFE institutes, they focus on the societal responsibilities of these organizations to challenge racism, the strategies that teachers can use, and the agency of students themselves in challenging racism through personal antiracism strategies, based on case studies. This is an example of ways in which life-world understandings of the situation of young people can support the development of personal strategies. As mentioned at the beginning of this chapter, the system-world lens, complemented by a life-world lens, offers a richer field of vision in which the bounds on human strivings and aspirations are recognized, along with the means sought to realize broader and fairer modes of participation.

Shared Experiences of Social Class

Social class has continued to shape educational participation and outcomes. Young people from less privileged family backgrounds are more likely than their privileged peers to leave school early, are less likely to participate in vocational and higher education, and are more likely to be underemployed. These continuities are now viewed not only in the contexts of changing class structures, but also in terms of shifting perspectives on the concept itself. The ways in which people are positioned by social class in changing social landscapes depend not only on occupational stratifications, but also on wider social and cultural relations. How people understand and make sense of their place in the social world is fundamentally influenced by dimensions of class, gender, and ethnicity, which

interact with institutional structures reflexively to shape horizons and beliefs about what is possible and desirable for them to achieve in education, work, and their personal lives. For example, Brockmann's (2012) research shows that learner identities are formed through concrete experiences of learning and constituted in institutional settings that privilege certain forms of knowledge. The perspectives challenge entrenched and stereotypical views that many young people are "naturally" non-academic and therefore need predominantly "practical" vocational training.

The importance of examining the diverse ways in which social class mediates the experiences, identities, and actions of young people and adults is recognized in shifts away from grand narratives of social reproduction in education toward an understanding of the embeddedness of social class in the social relations of postschool participation in education and employment.

Where perceptions of social class were elicited from the participants in the Anglo-German youth studies of 1998–2000, social class awareness was shown to be mixed in with family and gender dimensions in complex ways, with much reference to the importance of "social connections" and the invisible social factors, beyond qualification and competence, which affect success. English research participants were more likely than their German peers to change their job expectations, usually (but not always) in an upward direction. They were also more independent of their parents in all groups. Social class was perceived to be more important by the young Germans than it was by the English. A minority of participants were willing to talk about their life experiences directly within a social class perspective, but many respondents, especially students in Germany, were aware of the influences and benefits of their parents' occupational background. The effects of "framing" in limiting what might be seen as possible by a young person from any particular social position (Bloomer & Hodkinson, 2000) came through strongly, but equally, beliefs were expressed that prospects could be expanded through qualifications, making new connections, and taking chances, irrespective of social background. However, class-based limits were widely recognized, with disbelief expressed that "talent always rises to the top." One quarter of the young research participants in the English city felt that social class/status does not affect life chances, although this was higher than the very small minorities of the Germans who were prepared to agree with this statement. Similarly, discussion of social background highlighted differences of meaning that need to be kept in mind in international debates on the salience of class. Insights into the influences of family background, and obstacles, both material and social, were explored through open questions about their perceived influences on occupational destinations and "career."

Relatively few of the items and measures designed to identify the dimensions of agency and control in the young people's lives were significantly associated with social class, where this was measured by father's occupation. There were many more significant associations with the young people's present career positions, including orientations toward long-term planning, a composite of items including goal orientation and alignment of career with personal interests. As well as providing an indicator of proactivity and of some forms of agency and control, this observation was of interest given the central place given by

Beck (1992) and other individualization theorists to people becoming the "planning office for their biographies." These are the theoretical constructs that emphasize human agency most strongly. A long-term planning orientation was one of the few variables significantly associated with the social class origins of the research participants. Although life chances might be increased by people's abilities to plan their futures and be strategic in pursuing careers, this finding has suggested that this is the very characteristic with structural foundations in social class.

Comparisons can be made with findings from the 2015 LLAKES studies, as some parallels and contrasts can be identified in the perceptions of the young people interviewed in the UK (Franceschelli & Keating, 2018). Hard work, ambition, and education were cited as most important for getting ahead in life, each selected by more than 8 out of 10 of the young people interviewed. Few seemed to think that a person's race, religion, and gender were important. But approximately half thought having well-educated parents and coming from a wealthy family were important, indicating an awareness that social class factors play a role in shaping life chances. The interviews also identified overall optimism, despite the hard times of "austerity" that were prevalent at the time of the data collection. This optimism was also a feature of English young people interviewed in the Anglo-German studies, which revealed surprising levels of optimism even in the areas of highest unemployment (Bynner & Roberts, 1991).

As was mentioned in this chapter, Franceschelli and Keating's (2018) research, which has focused on understanding what lay behind this optimism, found that a general "turn to the self" was taking place, which was feeding the young people's sense of having some kind of control over their future. As in the 1998–2000 Anglo-German studies, this was experienced differently according to the young person's position in the social landscape. This turn to the self has appeared in 2015 more as a way of dealing with a dissonance between the actual realities and an imagined future, according to Franceschelli and Keating (2018), and seems to be connected with seemingly harsh judgments about those who were "falling behind," ascribing this to lack of hard work and commitment, most often the poor, the unemployed, and welfare benefit claimants. The comparison suggests a hardening of views between the 1998–2000 interviewees and those interviewed in the harsher economic conditions of 2015. In the 2000s, responses were interpreted as indicative of the insinuation of the messages of market ideology and narratives of "success." The 2015 results seem to confirm an intensification of that process.

These perceptions contain some messages for those debating alternative VET strategies, particularly those who focus on ways of overcoming the apparent lack of "attractiveness" of VET among young people. Young adults value education and qualifications and believe in the rewards of hard work for getting ahead. So why is the apparent lack of "attractiveness" of VET such an intractable, international issue? Virolainen (2014), Virolainen and Stenström (2015), and Jørgensen (2015) have noted the gendered and classed processes in different VET strategies in Nordic countries, and the enduring problems of perceived lack of status and the search for an elusive "parity of esteem." In Germany, writers who have noted the relationship of VET to class include Deissinger (2015), Müller (2014), and

Schmidt (2010), whereas Brown et al. (2011) provide wider international analyses. In the UK and many other societies, the lack of attractiveness of many forms of VET is rooted in longstanding low status and lack of the elusive "parity of esteem" with academic studies. There is high-quality provision that is very attractive for young people, but there are not enough organizations and places with such provision, and low quality predominates. By contrast, in Germany, the quality and standing of VET and the earnings' returns in the labor market are less variable and more secure. In systems in which VET and academic pathways run in parallel, young people from working-class backgrounds are disproportionately represented in the VET pathway. Where pathways truncate opportunities for educational progression to higher education via VET, social inequalities are entrenched by the system. However, upgrading VET pathways to enable progression to higher education opportunities does not level the playing field, as the beneficiaries are often disproportionately children of middle-class families who have missed out on the conventional academic route. This pattern has been repeated in Italy, where inequalities in accessing university are shown to be increasing as the role of the upper secondary tracks changes (Ballarino & Panichella, 2016).

The changing nature of occupations is itself involved in reconstituting conceptions of class (Brynjolfsson & McAfee, 2014; Savage, 2007). Because VET is intimately connected to the status of occupations, and the length and depth of VET programs have historically been a feature in designation of skills levels, the role of VET in the changing social structures of the twenty-first century is in itself part of the rethinking of class analysis that promises to bring the wider structures of social inequalities into view.

Agency at the Intersection of System-Worlds and Life-Worlds

The perspectives on gender, ethnicity, and social class discussed so far suggest that reflexive processes operate in differentiated and complex ways in relation to subjectively perceived frames for action and decision. A person's frame has boundaries and limits, which change over time, but which have structural foundations in ascribed characteristics such as gender and social or educational inheritance, and in acquired characteristics of education and qualification. Importantly, these frames for decision and action are mediated by institutional structures, environments, and processes.

A retrospective review of the life and work transitions of youth and early adulthood in contrasting socioeconomic contexts has revealed how, if a young person embarks on this risky voyage in a clearly defined progression of learning and qualification with adequate guidance and support, this tends to bring stability to the unfolding life course. Evans and Heinz (1994) showed how, if a diffuse, short-term sequence of activities is embarked on in a way that is reactive to immediate job demands and upheavals, the risks are far greater. Self-confidence seems to arise out of success in completion of tasks, from vocational choice to labor market entry. As youth shades into adult life, confidence continues to stem from

cumulative experiences of success in roles, from feelings of control in personal decision making about jobs to experiences in job changes as employment structures and work contexts change. The converse is also true as people encounter setbacks in the labor market, which cumulatively undermine confidence as people are positioned as deficient in relation to labor market or system demands. Some aspects of young people's and adults' experiences, particularly those least powerfully placed in the social landscape, transcend national and cultural differences despite substantial variations in regulation and custom, as the successor European-wide comparative studies by Evans and Niemeyer (2004) and Heidegger et al. (2004) have shown.

As social actors in changing social landscapes, people perceive the horizons not only from where they initially stand in the landscape, but also according to where their journey takes them. As I have elaborated elsewhere (Evans, 2009), where they go depends on the pathways they perceive, choose, stumble across, or clear for themselves and the terrain and elements they encounter. Their progress depends on how well they are equipped, the resources and help they can call on, and those with whom they associate themselves. Evidence from interviews with young people reported in this chapter and in wider European research reviews (Helve & Evans, 2013) has consistently shown that young people place considerable importance on individual effort and express the belief that if people work hard and achieve suitable qualifications, then they should be able to follow their own independent pathway in adult life. Social connections, forging them, and "making them work for you" as well as the importance of image and self-presentation are much emphasized. However, young people are certainly not blind to the influences of economic and social structures, but the least advantaged emphasized that they have to be "realistic" in their individual aspirations and goals. It was striking that there was little sense of fatalism in any of the Anglo-German interview encounters, with only three interactions out of hundreds coded as displaying fatalistic attitudes. Frustrated agency and struggle continue to characterize the day-to-day experiences of many of the young people who are in disadvantaged situations, yet they express optimism for the future. These young adults were undoubtedly manifesting a sense of agency, but there are boundaries or barriers that circumscribe and sometimes prevent the expression of agency, and challenge the simplistic application of the concept of "individualization" in differing socioeconomic and cultural environments.

Institutional and material resources to support young adults in work entry require the institutional help of the welfare state for young people who are not yet in the employment system. For young people who respond to systemic and market changes by taking chances, forms of material support should be readily available, to ensure that they are not stretched beyond their capacities to deal with difficult life situations unaided. Stopgap measures often heighten social inequalities, as poor-quality provision can increase instability and become stigmatizing (Avis et al., 2017; Behrens & Evans, 2002; Bynner & Roberts, 1991). As pathways to work have become more socially segmented and the risks of underemployment and joblessness have increased and widened in scope (Cote, 2003; Heinz, 1999), it appears that only at the extreme ends of the spectrum of

advantage and disadvantage are pathways and destinations relatively unaffected by the current social and economic changes.

   At the outset of this chapter, I pointed to the ways in which "social regularities" revealed by survey research become much more difficult to interpret when they are connected to the voices and purposeful activities of the social actors moving in highly differentiated social landscapes. Furthermore, the dynamics of the social processes of class, gender, and ethnicity have to be better understood in the changing occupational and social landscapes of the twenty-first century (Penn, 2016). Although earlier life experiences can bring stability or instability to the adult life course, the initial trajectories of education–work transitions branch out in so many directions that typologies or pathways become crude or meaningless. Systematic comparisons of the interplay of life, work, and learning in adult populations can give some sense of the social regularities in adults' perspectives and how these relate to their socioeconomic context and past experiences (Field, 2013; Jenkins, 2013). Evidence on adults' experiences of working life and their engagement with the social practices of work sheds further light on how learning in adult life also operates through mesolevel engagements in and through the social world, the environments and institutional practices of everyday life.

   The evidence on the accumulations of risk and positional advantage as people work, learn, and live their lives in changing social landscapes poses particular challenges to VET systems, which are expected to combat disadvantage at the same time as promoting competitive advantages. The ways in which skills are recognized or overlooked have important effects on the ways people move in social landscapes. The skills that are recognized and rewarded in society reflect the power and influence of social groupings. The valuing of cognitive attainment over practical and vocational abilities and the attribution and reward of skills according to gender, ethnicity, and social class are manifestations of deep-rooted power differentials in society. Yet, spaces open up for action that cannot be wholly reducible to the effects of social reproduction or underlying structural features. There are obviously constraints that affect the young, particularly as they try to find and construct their place in the changing "social landscape." There are other constraints that make it very difficult for mature adults who have broken "career" histories and have spent significant amounts of time out of the labor market to re-establish themselves in occupations and gain just recognition for the capabilities they can offer. These social regularities have been consistently identified in European-wide studies of youth, work, and VET (Evans & Niemeyer, 2004; Helve & Evans, 2013; Weil, Janen, & Wildemeersch, 2005) and adults' participation in VET systems (Heidegger et al., 2004). Many of the constraints on young people are embedded in the underlying structures and will be very difficult to influence or remove, but others might be reduced through actions of key players at the local level, and new policy initiatives can give legitimacy to fresh ways of thinking. All VET initiatives would benefit from systematic identification of the "framework conditions" that are necessary for effective implementation. As mentioned earlier in this chapter, policies sensitive to social justice must also guard against the greatest demands to "take control of their lives" falling on those who are the least powerfully placed in the social landscape.

What Is It Possible to Change Through Institutions of Vocational Education and Training?

What can VET practitioners actively do to encourage and support change, while recognizing that what VET can achieve will always be subject to wider social structures and policy processes? What influences can be exerted by VET practitioners to promote equity and social justice within systems that have enduring socially reproductive functions? To activate practitioners more fully (in the context of in-company training as well as VET institutions), action is first needed to counteract the processes that render barriers invisible to many practitioners. For example, "tiredness" with gender issues is often expressed in the UK (Evans, 2006) and more widely in European VET (Heidegger et al., 2004), and the problems of inequalities are too readily perceived as already addressed by learner-centered practices that "treat everyone as an individual." The availability of mentoring by people who have themselves had to negotiate barriers and challenge gender-, race-, or class-based penalties is one approach. A second approach lies in the promotion and wider use of pedagogical approaches that support the development of competences in the direction of critical insights and critical engagement in their VET and work environments, as part of dialectical, or "shaping," processes. Teaching that encourages participants to explore and challenge assumptions and discriminatory practices can build in race and gender issues and provide identity support. "Doing gender" (Kruger, 1991) has gained traction. Onsando and Billett (2017) explore the scope for organizing learning activities that support the agency of the learning individual and provide affordances for challenging racism and racial discrimination while aiming at full participation. At another level, supportive networks of practitioners need to be created that are committed to the advancement of equity and social justice. For example, in the same way that colleges would not dream of sending a trainee to a placement that had poor health and safety practices, VET institutions could take steps to ensure that placements are only used that can demonstrate satisfactory human resources policies and practices in relation to equity and diversity. This can be done in a nonbureaucratic way by establishing networks of practitioners with common aims and goals. Steps can be taken to involve teacher and trainers who are not already committed to change in this field, with approaches that are fresh (based, e.g., on identity, work, and evidence-informed practice) and feasible (e.g., networks-based). At the same time, there should be recognition that working for policy change in the framework conditions at a societal level requires engagement in political processes that should take place alongside and in parallel with the creation of such networks.

Recommendations addressed to VET practitioners are important if they affect practices at the micro level. However, policymaking on a meso level has to provide the framework conditions for these practices to be successful. This includes the frameworks of antiracism and anti–gender discrimination regulations and training for teachers, trainers, and personnel managers. In addition, the macro societal conditions are of utmost importance, for example setting wages according to gender equity, ensuring the implementation of national antiracist strategies, and making provisions for childcare, parental leave, and part-time work.

The systemic features can change, but they are slow to do so as the conservative forces are great and the state of social development is uneven. Yet, as the power relations in gendered, racialized, and class-based regimes are subject to conflicting social interests, the formation and dissolving of accepted categories, and the restructuring of institutionalized relations (Connell, 2002), improvement entails an understanding of how power relations operate at all social levels.

VET can only exercise partial influences on the forces and factors that generate and support social inequalities. It cannot by itself change macro social forces or the early experiences of individuals. But institutional VET does offer learning spaces that can influence profoundly how young people and adults understand and make sense of their work and how they respond to the structures imposed on them. The promotion of deeper understanding of how they use their skills, knowledge, and emotions; how and why they suffer injustices; and how they can represent themselves (Noon & Blyton, 2002) is achievable in and through VET practices, environments for learning, and the efforts of adequately supported VET practitioners.

Conclusion

A comprehensive understanding of the interactions of gender, race, and social class in VET requires greater depth of evidence and analysis. Social class is being reformulated and better understood in terms of effects of different strategies for VET, including insights into the consequences for inequalities. Calls to reinvigorate critical investigations into gender and race research in VET recognize that the intersections of class, gender, and ethnicity require much more than acknowledgment and "passing comment" (Cedefop, 2011). Theoretical and empirical analyses of the VET experiences of any particular social group must be conducted in ways that enable a consideration of the salience of gender, ethnicity, race, and class in these processes.

In summary, research is going beyond evidence of the inequalities in outcomes associated with gender, ethnicity, race, and social class, toward more telling accounts of the ways in which people experience the effects of these influences in their personal lives, and offering insights into the sources of variations that depend on positions in the social landscape. Social locations affect the ways that people interpret their experiences and perceive relative advantages or advantages in education and the labor market. VET systems are integral to the institutional frameworks that interlock in ways that often entrench inequalities. At the same time, VET institutions can create spaces in which inequalities can be challenged.

An aim of research is to expand awareness of the spaces VET practitioners can create and use to advance equity. In summary, we need to find better ways, within the structures and practices of VET, of "doing" race, gender, and social class. It is also important to recognize that inequalities arising from social positioning are at least as evident in workplace participatory practices as they are in VET participation patterns (Billett, 2006), and that at least as much work activity takes place outside paid employment as within it. The engagement of young people and

adults with vocational learning has to be interpreted in the contexts of the wider dynamics of employing organizations, changes in the organization of work, and the local communities in which working lives and careers are played out. At the macro level, shifts toward various forms of self-employment are themselves part of the wider social context. Those researching the ways in which inequalities are generated, sustained, and challenged by these changing dynamics of work and vocations have to pay more attention to the vocational learning dimensions than has been the case in the past.

The responsibility to strive for social change entails wider social responsibilities, exercised at the macro, institutional, and individual levels. It includes the social responsibility of people to assert their identity and preferences, on their own account, and collectively, for themselves and others. The potentialities and spaces for change that unfold at the level of intermediary organizations such as VET institutions are often underestimated. Here, personal strivings and practitioner capabilities can combine to accommodate people's preferences and the functionings they have reason to desire (Sen, 1992), while working to reduce the barriers they face. This equates to the exercise of social responsibility at the meso level of VET, setting up interdependencies that can feed into the macrolevel improvements in societal framework conditions that can be worked for collectively.

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24

The Contribution of Vocational Education and Training in Skilling India

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Introduction

India is one of the youngest nations in the world, with more than 62% of its population (total: 1.2 billion) of working age (15–59 years) and more than 54% of its total population younger than 25 years of age. Its population pyramid is expected to "bulge" across the 15–59 age group over the next decade. It is further estimated that the average age of the population in India by 2020 will be 29 years, compared to 40 years in the USA, 46 years in Europe, and 47 years in Japan. During the next 20 years, the labor force in the industrialized world is expected to decline by 4%, whereas in India it will increase by 32%, standing at around 500 million with a further 1 million people entering the labor market on an annual basis. However, leveraging this "demographic dividend" is easier said than done on account of the poor level of skills possessed by the vast majority of those joining the workforce each year. This is due to a variety of reasons, including high rates of school drop-outs, inadequate skills training capacity, a negative perception around training, and low employability of even those holding professional qualifications, such as degrees in different engineering disciplines (Nayana & Kumar, 2017).

It is now accepted that the education system must be attuned to the new global environment by promoting creativity and improving the quality of education and training at all levels to produce the large pool of skilled workers necessary for attracting industrial investment, including foreign direct investment (Majumdar, 2017). The Indian economy has grown substantially in recent years through the expansion of offshored business and financial services linked to new communication technologies, financial and legal services, healthcare, and biopharma. At the same time, employer surveys report major skills shortages in these sectors, as well as in tourism, retail, and skill-intensive manufacturing (OECD,

2017). Liu and Finegold (2017) point out that sustaining this growth faces significant challenges due to rising labor costs in the major cities, inflation, and competition from other countries offering similar services, such as Vietnam, Thailand, the Philippines, and parts of Eastern Europe. They argue that as well as improving education and training, Indian companies and multinational companies choosing to locate in India will have to continue to "move up the value chain into higher valued-added service and manufacturing markets" (Liu & Finegold, 2017, p. 545). It is estimated that only 4.7% of the total workforce has undergone formal skill training, much less than in China or South Korea, and the vast majority of workers are not covered by labor laws (Liu & Finegold, 2017, p. 545). Developing skilled workers enhances the efficiency and flexibility of the labor market and reduces skills bottlenecks, as skilled workers are more easily absorbed into the economy and their job mobility is improved. It is crucial to invest in quality secondary and tertiary education and in vocational education and training (VET) if India's economy is to develop and remain competitive in world markets (World Bank, 2018).

The country's 12th Five-Year Plan document (Government of India, 2013) clearly states that there is an urgent need to mainstream skill formation in the formal education system and at the same time develop innovative approaches for skill creation outside the formal education system. Although the Coordinated Action on Skill Development has brought about a paradigm shift in addressing the issues of relevance in skill development, the gaps in skill development are to be identified so as to achieve the objectives in terms of quantity, quality, outreach, and mobility while building on the foundation. Furthermore, some of the areas that merit attention, according to the plan, are (a) the challenge of reaching out to the nonformal sector; (b) putting in place a National Skills Qualification Framework (NSQF) that lays down different levels of skills required by industry, allows multiple points of entry and exit, recognizes prior learning, and allows for mobility across different levels; (c) putting in place a permanent institutional framework that is entrusted with the requisite authority and resources, and is responsible solely for skill development in the country; and (d) supporting students in terms of access to bank loans on soft terms that are linked to their placement. Thus, appropriate infrastructure needs to be created, albeit within the context of a large population, sectorial division, and spatial disbursal not only across the country but also in relation to the demand for Indian workers in other parts of the world. Chenoy (2013) argues that enrollment in vocational courses in India lags well behind those in China and the USA, and that a mere 2% of Indian workers are formally skilled.

The 2015 National Policy for Skill Development and Entrepreneurship (Government of India, 2015) has the avowed goal of meeting the challenge of developing skills at scale with speed, standard (quality), and sustainability. It aims to provide an umbrella framework for all skills activities being carried out within the country, align them to common standards, and link them to demand centers. In addition to laying down the objectives and expected outcomes, the policy also identifies the overall institutional framework, which will act as a vehicle to reach the expected outcomes. Development of skills is the shared responsibility of all key stakeholders, including the government, the corporate sector, community-based organizations, various domain experts, and dedicated individuals, among

others. More crucially, the policy links skills development to improved employability and productivity in paving the way forward for inclusive growth in the country. An important element in working toward this avowed goal is the modernization and professionalization of VET.

Given that VET in India is still in a highly complex phase of development, this chapter offers a historical account starting from the pre-independence period through to the present. This history, along with the cultural and geographic diversity of the country, the population size, and the contemporary economic challenges, means that many other countries are looking to India with interest to see how and if VET can be organized to meet the needs of the twenty-first century. The chapter argues that although accomplishing the goals and objectives of VET is saddled with several challenges due to a geographically vast, socioculturally diverse, and huge population living with severe economic disparities, there have been continued and concerted efforts to enhance the character of VET by addressing issues, including geographical coverage, socioeconomically disadvantaged sections of society, and enhancing the quality through improved curricula, creating a vibrant interface between VET and the contemporary needs of industry, and achieving a competitive advantage at the international level.

Historical Milestones of VET in India

Education in India was generally identified with liberal education. The *Education Dispatch*, issued by Sir Charles Wood, the president of the Board of Control, famously known as *Wood's Dispatch*, formed the basis of the education policy of the East India Company's government in India from 1854. The *Dispatch* highlighted, for the first time, the need for the introduction of occupational education for a sizeable segment of the student population. Furthermore, it highlighted the need for imparting Western knowledge and information, to create a class of public servants, to develop practical and vocational skills of the Indian people so that more and more goods could be produced, and to create a viable market for consumption of those goods. Since then, several commissions, including the Hunter Commission of 1882, the Hartog Committee of 1929, and the Sapru Committee of 1934, emphasized the vital role of vocational education in the country's economic development.

The Hartog Committee recommended diversified courses in the schools to enable the students to prepare for industrial and commercial careers at the end of middle school as preparation for special instruction in technical and industrial schools. The Sapru Committee recommended 11 years of school education (5 years for primary, 3 years for lower secondary, and 3 years for higher secondary), with vocational studies commencing after 11 years of education. The main purpose of the Sapru Committee was to find ways and means of solving unemployment problems through diversified courses at the secondary stage; however, its impact on the educational administration was minimal. In 1936, following concerns about university graduates not being able to find jobs, the Wood–Abbot Commission prompted the creation of a network of polytechnics in India.

The importance of providing basic education along with introducing young people to vocational skills was recognized during pre-independent India and advocated by the Father of the Nation, Mahatma Gandhi, and it holds a unique place in the history of elementary education in India. The Gandhian philosophy of education highlighted the need for achieving high moral values, dignity of labor, and the importance of learning crafts at the early stages of education. The Wardha Commission of 1937 gave a concrete shape to this educational philosophy, which would, in essence, provide children with education in reading, writing, and arithmetic in addition to teaching them a vocational skill, thereby inculcating dignity of labor among the children. This was further reinforced by the observation of the Committee of Members of Parliament on National Policy on Education in 1967 that work experience should be an integral part of general education at the school stage.

A major weakness of the present education system is the dysfunctional linkage between education and the world of work. It must be mentioned that preparation for the world of work must begin at an early stage of a child's educational journey. It is a paradox that acquisition of skill at the primary and upper primary levels, which was propounded as an important part of the educational policy through such efforts as the Wardha Commission and Gandhi's pedagogical philosophy, among others, was struck a major blow due to the dominance of Western educational philosophy and the priority placed on rapid industrialization. This impact is felt even today. Despite the fact that the Hartog Committee recommended diversified courses to enable students to prepare for industrial and commercial careers at the end of middle school, basic education was regarded by the urban middle class as suitable for rural children, but not for their own (Gore, 1995). The landed gentry of the villages rejected the new system because they saw it as a device to deprive their children of good education. This was also buttressed by the fact that there was, as mentioned, a dysfunctional linkage between education and the world of work (CRRID, 1985).

Following India's independence from Britain in 1947, the Radhakrishnan Commission of 1948 recommended that, in order to direct school students to vocational training at the end of compulsory schooling, a large number of intermediate colleges should be opened. The Commission stated,

> The aim of these colleges would be to meet a variety of needs of our young men and women by giving a vocational bias to their courses by retaining at the same time their value in a system of general education as preparation for university courses. (Chandra, 2003, p. 147)

In 1952, the Mudaliar Commission reiterated this by saying, "[T]he secondary education is a complete unit by itself and not merely a preparatory stage that at the end of this period the student should be in a position, if he wishes, to enter into responsibilities of life and take up some vocations" (Chandra, 2003, p. 270). It also recommended diversification of the courses at the secondary stage. This resulted in the creation of multipurpose schools. Unfortunately, for various reasons, including lack of proper appreciation of the scheme, inadequate

preparation in terms of infrastructure and teaching staff, and overemphasis on preparation for university courses, the multipurpose schools were reduced to shadows of what were intended to develop. In 1955, the All India Council of Technical Education (AICTE) was set up to advise the Union Government on all aspects of technical education at the diploma as well as degree levels. Around the same time, a network of Industrial Training Institutes to train the base-level industrial workers was created.

Some basic academic considerations again compelled the government to appoint an Education Commission in 1964, under the chairmanship of Dr. D. S. Kothari, to reexamine the entire educational system of the country, keeping in view the national goals, improvement of quality, and standard of education. The Kothari Commission suggested that, at the higher secondary stage, there needed to be two distinctive streams: one preparing students for advanced education in the universities and the professional colleges, and the other preparing students for a variety of occupations immediately after completion of vocational studies to enable them to enter the labor market. In keeping with this recommendation, the Commission suggested that for college preparatory general education courses, the duration may be 2 years, and the duration of studies and training for the vocational stream may range from 1 to 3 years or more. Given the proper planning, cooperation, coordination, and implementation of the scheme, the Commission felt, it should be possible to divert at least 50% of the students who successfully completed 10 years of education to the vocational stream, thus reducing the pressure on the universities, on one hand, and preparing the students for employment (including self-employment), on the other hand. For a majority of vocational higher secondary students, it would be a terminal stage, although post–higher secondary and technical provision should be made available on a large scale so that those in jobs might benefit through part-time or evening studies.

The Central Advisory Board of Education, while deliberating at its 37th Session held in November 1974, observed that the financial allocation provided in the draft Central Plan for the introduction of vocational courses at the higher secondary stage was inadequate, and they recommended that the provision should be substantially increased. The Board also observed that the new courses should be started after taking into account the existing facilities to meet the demand for middle-level persons in the concerned district or state. They also suggested that the National Council of Educational Research and Training (NCERT) should develop model curricula and syllabi for such courses and provide guidelines to the state governments (Government of India, 1978).

It must be mentioned that the implementation of the recommendations of various commissions took a substantial time due to (a) the sheer vastness of the country, with all its sociocultural and physical diversities; (b) administrative delays; (c) inadequate manpower in remoter regions; (d) poor coordination among the bureaucratic system; and (e) priority on general education over vocational education. In the "Vocational Training Institutions in India's Education System" section, we attempt to describe the current organizational structure of VET institutions and pathways of educational opportunities available for students leading to vocational careers.

Vocational Training Institutions in India's Education System

The training institutions in the formal education system, which have played a major role in creating pools of skilled workers, include industrial training institutes (ITIs), industrial training centers (ITCs), polytechnics, community polytechnics, and community colleges. These are now discussed in turn.

Industrial Training Institutes and Industrial Training Centers

The Craftsmen Training Scheme (CTS) was introduced in 1950 by the Ministry of Labour to ensure a steady flow of skilled workers in different trades for domestic industry, to raise quantitatively and qualitatively industrial production by systematic training, to reduce unemployment among the educated youth by providing them employable skills, and to cultivate and nurture a technical and industrial attitude in the minds of the younger generation. The scheme, the most important in the field of vocational training, has been shaping craftsmen to meet the existing as well as future manpower needs through the vast network of ITIs. The government-owned ITIs and the private ITCs are the backbone of VET in India. In terms of student numbers, the former is much larger, whereas most private ITCs offer only a few trades. Between them, they cover some 116 recognized trades for the CTS and the Apprenticeship Training Scheme (ATS).

Polytechnics

Polytechnics create a pool of skilled manpower to support shop-floor and field operations as a middle-level link between technicians who are trained at the ITIs and ITCs and engineers who are trained in the universities. Small and medium-sized enterprises prefer to employ diploma holders from the polytechnics because of their special skills in reading and interpreting drawings, estimating, costing and billing, supervision, measurement, testing, repair, and maintenance. During the last decade, India has seen a tremendous increase in the number of engineering colleges at a degree level throughout the country. However, the growth of technical institutions has not been uniform as far as the number of polytechnics and degree engineering colleges is concerned.

Community Polytechnics

The community polytechnics act as important centers for the application of science and technology in rural areas and generate self-employment and wage-based employment opportunities through nonformal training in various trades. They have been established as entities within polytechnics rather than as autonomous institutions, and they utilize the qualified and trained faculty of the polytechnics. To that extent, they are part of the formal system, even though they provide training within communities. They design their own curricula and deliver short-term courses of usually 6 months' duration, free of any charges, and

the intake of trainees is limited to 15 per cohort per trade. They also deliver training in collaboration with government departments and other agencies.

Community Colleges

Community colleges form an alternative system of education aimed at the empowerment of the disadvantaged and the underprivileged (urban, rural, and tribal poor, and women) through appropriate skills development leading to gainful employment in collaboration with local industry and the community. This is an innovative educational alternative that is rooted in the community providing holistic education and eligibility for employment to the disadvantaged. The vision is to be "of the Community, for the Community, and by the Community" and to produce responsible citizens. The community colleges keep the community engaged with the affairs of the colleges in several formal and informal ways, including through representation on their academic and administrative bodies. The underlying principle is to provide a learning facility not more than a 30-minute drive from any community, thereby making education accessible and affordable. Strong college–industry interaction leads to regular updating of the curricula and opportunities for "hands-on" practice and experience through internships and job placements. As such, this initiative is in line with the Indian political will to prioritize primary education, information technology education, and VET. However, community college graduates suffer from a lack of recognition, indicating difficulties in employability, and the financial viability of the colleges is a problem due to their low fees.

Policy Approach for Vocational Education and Training

There was no clear articulation of a specific policy framework for VET until the 2015 National Policy for Skill Development and Entrepreneurship. The core objective is to empower individuals by enabling them to realize their full potential through a process of lifelong learning where competencies are accumulated via instruments such as credible certifications, credit accumulation, and transfer. This will involve the following:

- Making quality VET aspirational for both young people and employers, whereby the former sees it as a matter of choice and employers acknowledge the productivity potential of a skilled workforce by paying the requisite premium
- Ensuring both vertical and horizontal pathways to a skilled workforce by providing seamless integration of VET with formal education
- Focusing on an outcome-based approach toward quality VET that, on one hand, results in increased employability and better livelihoods for individuals; and, on the other hand, translates into improved productivity across primary, secondary, and tertiary sectors
- Increasing the capacity and quality of the training infrastructure and trainers to ensure equitable and easy access to every citizen

- Addressing human resource needs by aligning the supply of skilled workers with the sectoral requirements of industry and the country's strategic priorities, including flagship programs such as Make in India. Make in India is a new initiative to attract foreign investments in Indian industry, thereby raising domestic skill formation to international standards and career/employment opportunities.
- Establishing an information technology (IT)-based information system for aggregating demand and supply data to help in matching and connecting supply with demand
- Promoting national standards through the active involvement of employers in setting occupational standards, helping develop curricula, providing apprenticeship opportunities, participating in assessments, and providing gainful employment for skilled workers with adequate compensation.

The framework also aims to coordinate and strengthen factors essential for growth of entrepreneurship across the country. This would include the following:

- Promoting an entrepreneurship culture and making it aspirational
- Encouraging entrepreneurship as a viable career option through advocacy
- Enhancing support for potential entrepreneurs through mentorship and networks
- Integrating entrepreneurship education in the formal education system
- Fostering innovation-driven and social entrepreneurship to address the needs of the population at the bottom of the pyramid
- Ensuring ease of doing business by reducing entry and exit barriers
- Facilitating access to finance through credit and market linkages
- Promoting entrepreneurship among women
- Broadening the base of entrepreneurial supply by meeting the specific needs of both the socially and geographically disadvantaged sections of society.

To accomplish these objectives, the policy enunciates a set of paradigms and enablers, which forms the driving principles of skill development and entrepreneurship in the country: (a) Aspiration and Advocacy, (b) Capacity, (c) Quality, (d) Synergy, (e) Mobilization and Engagement, (f) Global Partnerships, (g) Outreach, (h) ICT Enablement, (i) Trainers and Assessors, (j) Inclusivity, and (k) Promotion of Skilling Among Women.

The entrepreneurship policy framework proposes a nine-part entrepreneurship strategy:

1) Educate and equip potential and early-stage entrepreneurs across India.
2) Connect entrepreneurs to peers, mentors, and incubators.
3) Support entrepreneurs through Entrepreneurship Hubs (E-Hubs).
4) Catalyze a culture shift to encourage entrepreneurship.
5) Encourage entrepreneurship among underrepresented groups.
6) Promote entrepreneurship among women.
7) Improve ease of doing business.
8) Improve access to finance.
9) Foster social entrepreneurship and grassroots innovations.

The policy also spells out a governance structure for effective and efficient implementation of program goals and objectives. A National Skill Development Mission, under the Ministry of Skill Development and Entrepreneurship, is visualized to implement and coordinate all skilling efforts in the country toward the objectives laid down in the policy, and it will be supported by three other institutions: the National Skill Development Agency (NSDA), National Skill Development Corporation (NSDC), and Directorate General of Training (DGT). Industry-led Sector Skill Councils (SSCs) are also being introduced to help link the requirements of industry with appropriately trained manpower. These bodies will collaborate with the National Institute for Entrepreneurship and Small Business Development (NIESBUD) and the Indian Institute of Entrepreneurship (IIE). The Indian government's aims and objectives for improving the content, organization, and governance of VET are clearly very ambitious and wide-ranging. In the "Challenges and Opportunities for VET and Skill Development in India" section, we discuss the challenges involved given the considerable longstanding problems that remain across both the education system as a whole, and the economy and society more generally.

Challenges and Opportunities for VET and Skill Development in India

VET in India faces a daunting task in trying to achieve the goals of the 2015 National Skill Development and Entrepreneurship policy. First, vocational education pathways have poor visibility due to low awareness among the stakeholders and lack of parity in wage structure between formally qualified and vocationally trained graduates (see Chapter 17). Furthermore, the general public perceives vocational training as an option for people who have not been able to progress or have opted out of the formal academic system, thereby creating a low demand for VET. This is due mainly to the tendency of industry to not properly discriminate between skilled and unskilled persons in relation to wages, thereby depriving the skilled workforce of any meaningful economic incentive. This is also compounded by the fact that most VET programs are not aligned to the requirements of industry.

The very fact that a huge proportion of skilled labor is in the unorganized sector poses a veritable challenge, and leveraging the "demographic dividend" mentioned at the start of this chapter is easier said than done. Major reasons in this regard include (a) a poor level of skills possessed by the vast majority of those joining the workforce due to high rates of school drop-out; (b) inadequate skills-training capacity; (c) a negative perception of skilling; and (d) low employability of even those holding professional qualifications, such as degrees in different engineering disciplines. Overarching these factors is the low priority given to accomplishing high *quality* among the skilled workforce. All policies and frameworks are only as good as their implementation on the ground (Nayana & Kumar, 2016). The quality of vocational training institutions is a major concern. The challenge is to facilitate these institutions to keep pace with the fast-growing technological demands for industry and the expanding universe of knowledge

through a well-designed quality paradigm. Furthermore, such an attempt to enhance the quality of training and training infrastructure through improved design and delivery systems would, more importantly, have positive employment outcomes for graduates from the vocational training system, especially in the existing industrial and economic scenarios where considerably high demand for professional technicians exists.

Research on the quality of ITIs (Nayana, Kumar, & Pilz, 2016) revealed the following challenges:

- Lack of awareness of the uniqueness and usefulness of the ITIs among parents, students, and industry has resulted in very poor demand.
- Training instructors reported that the professional development they received was beneficial, but there is an urgent need for them to participate in such programs on a regular basis to keep pace with the latest industrial advances. Currently, there are no career growth opportunities for trainers or instructors, which is a demotivating factor.
- The role of Institutional Management Committees (IMCs), which are advisory bodies with major industry representatives, appeared to be weak in many of the sample institutions covered, and limited their activities to only a few issues such as financial approvals, procurement-related matters, and, to some extent, student placements. IMCs appeared to have minimal roles in the areas of staff training and the constant interaction with industry required to instill confidence among students.
- The major problems experienced by students in the course of their studies included comprehension difficulties due to poor English and communication skills, no or inadequate stipend, lack of hostel facilities, and inadequate transport.
- Quality is only measured by the marks obtained by the students.
- The infrastructure and equipment of ITIs could be improved. In most cases, there is a shortage of machinery, tools, and space to teach modern technologies. There are also no regulations on maintaining machinery.
- A large number of teaching staff vacancies are not filled easily.
- There was a lack of autonomy in decision making with respect to recruitment, salaries, infrastructure development, and curriculum design.

The research also found that ITI principals showed that their understanding of quality is very strongly output-oriented. Employability and stakeholder satisfaction were the key markers of training quality. Quality is associated with both output and income, that is, the skills and expertise acquired by trainees and their opportunities in the labor market. In line with this definition of quality, the quality indicators used in the ITIs surveyed for the research focus almost exclusively on using tests and examinations to assess trainees' knowledge. Other commonly cited indicators include employment rates on completion of training at an ITI, drop-out rates, and completion rates.

The other input factors involved in quality of vocational training include quality of instructors, infrastructure and equipment, and curriculum. Most of the principals surveyed were satisfied with the training their instructors had, but some expressed concerns about their motivation, the currency of their

knowledge, and the availability of adequate numbers of skilled instructors. In half of the cases, principals appointed external instructors on a temporary basis to fill vacancies. However, these temporary staff often lacked the necessary skills, which did not enhance training quality. To ensure the long-term teaching quality, it was important that instructors received regular in-service training and that both their technical knowledge and their teaching methods were updated. There was little agreement, however, on implementation of in-service training, suggesting that such training is inadequate and nonstandardized.

VET in India is saddled, therefore, with many considerable challenges. However, it must be mentioned that serious and concerted efforts are being made to address these key issues at the governmental and industry levels. First, the NSQF is a means to improve the school-to-work transition through the formalizing of better integration between VET, general education, technical education, and the labor market. Vocational training classes will be introduced linked to the local economy from class 9 onward in at least 25% of schools over the next 5 years.

Second, employers have responded to the call for them to become more involved. In this regard, industry has partnered with the government through the NSDC and the SSCs to develop Qualification Packs covering over 4,000 National Occupation Standards. However, a lot more remains to be done. For example, there has been some reluctance on the part of industry to provide a wage differential for skilled workers, leading to low absorption of skilled manpower. Employers need to be educated on the benefits of employing a skilled workforce and the difference that skilled workers bring in terms of productivity and efficiency versus an unskilled worker. It is essential that they acknowledge the skills of individuals and pay them a premium salary compared to the unskilled laborers. This would help to encourage unskilled workers to seek training and generally raise the status of VET.

As was mentioned in this chapter, including women in the productive workforce is critical for the economic development of India. Some of the large schemes, such as Standard Training Assessment and Reward (STAR) and Pradhan Manatri Kaushal Vikas Yojana (PMKVY), have achieved close to 40% female participation, which is considered to be a significant achievement. India, as a part of the G-20 group of countries, has pledged to reduce the gap in women's workforce participation by 25% by the year 2025. The 2013 Global Gender Gap index, published by the World Economic Forum (2014), ranked India 124 out of 136 countries for women's economic participation. Improving this has to be tackled at multiple socioeconomic and cultural levels. Recently, there have been new initiatives launched toward projects focusing on skilling women and enabling them to become employed. These include, for example, the solid waste management company Vivam Agrotech, based in Maharashtra State, which is providing a sustainable livelihood to household women in villages and supporting them to become "entrepreneurs" by helping them to generate biogas and electricity using waste from the fields and households. Needless to say, initiatives leading to an increased focus on advocacy for the education and future careers of girls and aggregating various women and child welfare organizations would go a long way. A further step forward is the New Companies Act, which has made

corporate social responsibility (CSR) a strategic initiative. Companies are being encouraged to step forward and contribute their CSR funds for the purpose of expanding quality skill training in the country.

Like a number of other countries, including China (see Chapter 25), India is giving serious consideration to the possibility of adapting elements of the German dual system as a means to improve its VET system (Mehrotra, Raman, Kumra, & Röß Kalaiyarasan, 2014; see also Chapters 15 and 16, this volume). It is argued that India needs to adopt the dual mode for vocational training to stem the problems of educational drop-out and mismatch of skills. There are discussions going on at a governmental level to see how a dual approach can be integrated into the current apprenticeship scheme. As Euler and Wieland (2015) stress, however, "A national VET system seems best viewed as food for thought for innovation rather than as a blueprint for reforms or a finished export product" (p. 4). They explain as follows:

- A national vocational training system is a tool for achieving certain objectives, and these objectives can differ from one country to another. There is no "best" system; each one can be judged only by its success in achieving those objectives.
- A vocational training system is influenced by other social subsystems, and exporting it [or even individual features of it] is possible only if conditions (e.g., qualification structure and work organization) in the respective countries are comparable....
- It can happen that the vocational training system in a particular country is less developed, but that the country's system of advanced training plays a comparable role for the purpose of qualification and is more highly developed as a result (e.g. in Ireland or the USA…). The institutional context, the harmonization of the employment and education system, and cultural norms must be taken into particular account when considering the possibility of importing a training system. (pp. 6, 15)

Given these important caveats, Euler (2013, p. 30) argues that a distinction should be made

A distinction should be made between the "dual system," which refers to a specific configuration of training sites and institutional frameworks, and the "dual principle," which refers to making the best possible use of the respective learning opportunities. The dual principle is therefore a core element of the dual system, but it might also be implemented in connection with other combinations of learning sites. (p. 31)

The key element of a "dual" approach that is needed in the Indian context is the mechanism to combine theory and practice effectively. Various studies (e.g., Mehrotra, Gandhi, & Sahoo, 2013) highlight the need of application- and practice-oriented vocational education in India. Industry involvement in training initiatives has been extremely low. For instance, India has the lowest

level of in-company training among the BRIC (Brazil, Russia, India, and China) countries. The share of companies that are currently providing on-site in-company training to their full-time permanent workers is only 15.9% . This share of Indian companies offering training is low as compared to that in other developing countries. There has even been a decline in the percentage of companies offering in-company training recently. Given the low value perception of vocational education in India, the introduction of large-scale changes in the education system is a difficult task.

Conclusions

The vocational education system in India faces a daunting task in achieving the ambitious goals set out in the 2015 National Policy for Skill Development and Entrepreneurship. First and foremost, it has poor visibility due to several reasons, including low awareness among the stakeholders and lack of parity in wage structure between formally qualified and vocationally trained graduates. In addition, the public perception of vocational training regards it as a last option, something meant for those who have not been able to progress or have opted out of the formal academic system, thereby creating a low demand for VET in general. This is due mainly to the tendency of industry to not distinguish between skilled and unskilled persons, thereby depriving the skilled workforce of any meaningful economic incentive. This is also compounded by the fact that most of the vocational training programs are not aligned with the requirements of industry.

There has not been a well-crafted, exclusive policy on VET focusing on the contemporary industrial needs of the country. The newly 2015 Policy Framework clearly mentions that vocational training will be integrated with formal education, and the seamless integration of vocational training in formal education is expected to ignite student interest. However, these developments need to be connected to the needs of industry. The NSQF will require competent assessment and certification bodies to provide support to the School Boards for assessment and certification of VET programs. The new special programs for providing skill training to those who have 8 years or more of schooling will need to be aligned to the appropriate NSQF levels. Adapting a dual model of VET to the Indian context could provide an effective means to achieve a more coordinated system.

Industrial and labor market trends clearly indicate the necessity of strengthening vocational education in India. The introduction of vocational education through bivalent schools will help broaden the vocational base at the secondary level. The introduction of vocational degrees and the setting up of a vocational university with polytechnics, community colleges, and community polytechnics as affiliated colleges are some of the recommendations that require further deliberation. The poignant goal of the present government, *Make in India*, further necessitates the revamping of the educational system through formal professional development for teachers and trainers. Finally, in an internationally

competitive training environment, the implementation of quality management systems in VET can provide a competitive advantage in preparing the quality workforce required for micro- and macroeconomic reforms. Sharing experiences will be increasingly important, enabling India to access the experiences of other Asian countries with better quality management systems.

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25

Vocational Education and Training in Economic Transformation in China

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Introduction

After a period of economic slowdown and the declining labor force participation rate, economic development in China has entered a new phase in which economic transformation has become an important concept to achieve sustained economic growth and social development. There are differences in this regard across the country. Northern China, represented by the northeast provinces, is the country's energy base and the site of its old industrialized regions. Due to the fact that energy exploration has entered into a recession and the overall level of the manufacturing industry is relatively backward, economic development faces major structural and social problems. The core of the economic transformation is to develop alternative industries with an aim to achieve industrial innovation and economic revitalization. Southern China, represented by Guangdong, Zhejiang, and other southeast provinces, is at the forefront of economic reform. The purpose of its economic transformation is mainly to narrow the technological and managerial gap with the developed countries. The aim is to make full use of modern technologies to upgrade traditional industries, to develop high-tech sectors, and to optimize the economic growth pattern.

Economic transformation exerts increasingly high pressures on resources and the environment. The lack of a sufficient number of qualified skilled personnel is a significant constraint in addition to an irrational industrial structure and weaknesses in sustained creativity. In 2014, the State Council promulgated the Decision on Accelerating the Development of Modern Vocational Education. Liu Yandong, vice premier of the People's Republic of China, stressed the importance of "developing modern vocational education with Chinese characteristics to provide support in terms of human resources for economic transformation and improvement of people's livelihood" (*Tianjin Daily*, 2015). Thus, the central

government's staunch support has advanced the development of vocational education and training (VET).

At present, given the size of the population, the scale of VET in China is huge, and it faces many problems in relation to deficiencies in the administration system, low efficiency in school and college management, insufficient development of training programs, and a lack of cooperation between educational institutions and industry (see also Chapter 22, this volume). This chapter examines the development of VET in the economic transformation in China.

The Structure of VET in China

Considering the huge regional differences in economic and social developments, China is trying to establish a VET system that guarantees a simultaneous and interconnecting development of school education and short-term training. According to the country's Vocational Education Law, VET has two elements: vocational school/college education and vocational training. School education at the secondary and tertiary levels is the backbone of the Chinese VET system. Chinese vocational school/college education is divided into three levels: elementary, secondary, and higher education.

Elementary Vocational Education

Elementary vocational education is mainly found in underdeveloped rural areas or sparsely populated remote regions. It is a part of the 9-year compulsory education system and is delivered by elementary vocational middle schools. Alternatively, a *3+1 model* can be adopted (i.e., one year of training after graduating from ordinary junior high schools) with basic skills as its main learning content. With the popularization of senior high school education, the scale of elementary vocational education is getting increasingly smaller in scale and is withdrawing from the stage of history. It tends to focus on students with physical and learning disabilities. According to statistics from the Ministry of Education (MoE), there were only 5,081 students in elementary vocational schools in 2015 (Ministry of Education, 2016).

Secondary Vocational School Education

Secondary vocational education aims at training middle-level skilled workers and service personnel with all-round competencies. Students may choose to enter the labor market upon graduation or register for the entrance examination to enter higher vocational education. There are three kinds of schools at the secondary level: vocational high schools, secondary specialized schools, and skilled worker schools. The existence of these three kinds of schools is mainly owing to historical reasons, especially the overlapping management arrangements between the MoE and the Ministry of Human Resource and Social Security (MoHRSS).

- Vocational high schools were established during reforms to secondary education from 1985. They were reorganized from the general high schools (mostly with weak infrastructure). They enroll graduates of junior high schools.

- Secondary specialized schools were developed on the basis of taking over old vocational high schools after the founding of the People's Republic of China. Originally, they were aimed at cultivating technologists and teachers of primary schools and kindergartens. Because of the difficulty in satisfying changing societal demands, these schools have gradually closed down since the end of the twentieth century. Now, they train skilled workers and service personnel on 3-year programs.
- Skilled worker schools were developed on the basis of training institutions in companies and cities after the founding of the People's Republic of China. They enroll young people with different educational backgrounds (mostly graduates of junior high schools) on programs lasting 2 to 4 years to train skilled workers. Some of the best skilled worker schools have been upgraded into *technician institutions* to train technicians. Skilled worker schools and technician institutions are under the administration of the MoHRSS.

General speaking, there is not much difference in the training targets and curricula of the three types of vocational schools. As a result, the term *secondary vocational* (and *technical*) *school* has been used in VET practice and is used in this chapter to refer to all these schools.

Higher Vocational Education

Higher vocational education offers education and training at the tertiary level (i.e., education after senior high school). It is mainly provided by vocational universities and vocational and technical colleges, who enroll graduates of high schools, inclusive general high schools, and different types of secondary vocational schools on 3-year programs. Graduates can get higher college attainments to enable them to study further in a bachelor's program or go directly to the labor market.

- Vocational universities were established in the 1980s as "local universities," according to the needs of the local economic development built by regional governments. They cultivate high-skilled practical personnel with practice-oriented study programs.
- Vocational and technical colleges have been mostly reorganized from the secondary specialized schools with good infrastructure and rich experience since the end of the twentieth century.

In recent years, the central government has begun to attach greater importance to higher vocational education. The number of institutions and students has been constantly increasing. In 2015, there were 1,341 vocational and technical colleges and vocational universities with a total of 10.48 million students enrolled in regular programs (Ministry of Education, 2016).

Despite this dramatic expansion, however, the provision still falls short with regard to meeting the country's needs. One of the reasons is that a purely school-based training approach does not satisfy the demands of industry. In recent years, China has put greater efforts into school–enterprise cooperation in VET, particularly with respect to curriculum development and teaching–learning processes. Such cooperation could be categorized by temporal, spatial, and

organizational elements. For example, *phase training organizations* are organized according to school years—for example, 2 years in school/college + one year in a company—or *ex situ*, which involves different training phases in different learning venues. There is also an increasing number of colleges carrying out modern apprenticeship pilot experiments (Zhao, Rauner, & Hauschildt, 2011).

With the introduction of information technology, more types of study arrangements are being introduced. This has broadened the profile of students in higher vocational education:

- Full-time students on short-cycle courses doing an internship in companies for half or one year
- Part-time adult students on short-cycle courses. They mainly study theoretical courses and can acquire an adult education diploma.
- Students studying short-cycle courses online. They can acquire a vocational education diploma.

Vocational Training

Vocational training is training that prepares people to work in specific jobs. According to Article 14 of the Vocational Education Law, vocational training includes pre-employment training, occupation change training, apprenticeship training, on-the-job training, and job transfer training. Compared to the education in vocational schools and colleges, vocational training has relatively specific content, diversified forms of delivery, targeted approaches, and varied forms of funding. Institutions providing vocational training include vocational schools and colleges, employment training centers of authorities responsible for human resources and social security, training departments of companies, and commercial training institutions. The training objectives, duration, contents, and requirements vary depending on the nature and types of jobs and tasks. Upon successful completion of coursework and examinations, trainees can receive an occupational certificate at a nationally recognized level.

According to statistics from MoHRSS, there were 2,636 employment training centers and 18,887 private training institutions nationwide in 2015, with a total of 19.08 million trainees. Among them, 9.67 million were migrant workers, 3.57 million were unemployed persons, and 800,000 were junior/high school graduates. A total of 18.94 million people participated in the occupational qualification certificate tests, of which 15.39 million obtained certificates. Among them, 0.55 million obtained a technician-level certificate or above (Ministry of Human Resource and Social Security [MoHRSS], 2016).

Economic Transformation and the Challenges for VET

Since the 2008 global financial crisis, China's economic development has entered a so-called *lower-high-speed development period* under the "New Normal." This term was proposed by President Xi Jinping in 2014 and refers to the current

Table 25.1 Share of the Contributions of the Three Strata of Industry to the Increase in GDP (%).

	Share of the contributions of the primary industry to the increase in GDP (%)	Share of the contributions of the secondary industry to the increase in GDP (%)	Share of the contributions of the tertiary industry to the increase in GDP (%)
2008	5.2	48.6	46.2
2009	4.0	52.3	43.7
2010	3.6	57.4	39.0
2011	4.2	52.0	43.8
2012	5.2	49.9	44.9
2013	4.3	48.5	47.2
2014	4.7	47.8	47.5

Source: National Bureau of Statistics of China (2016).

economic situation where growth of Gross Domestic Product (GDP) slows down, causing the growth pattern to change from high-speed into mid-to-high-rate growth, and requiring the economy to transform from the production investment-driven model into an innovation-driven model. To ensure a soft landing of economic growth, China has initiated economic restructuring with the main goal to expand national domestic demand.

The development in recent years shows that the contribution of value-added of the tertiary industry (service sectors) to overall GDP increased from 46.2% in 2008 to 47.5% in 2014, indicating the growing influence of the tertiary industry in stimulating economic growth. Due to changes in external demand induced by the financial crisis, the contribution of the secondary industry to GDP growth fluctuates greatly and shows a slight decrease in recent years (e.g., 47.8% in 2014). This means that the influence of the secondary and the tertiary industries in stimulating economic growth is basically equal. However, the tertiary industry shows a growth trend, as has been experienced by most developed countries (see Table 25.1).

Economists believe that the current direction of China's industrial restructuring is to promote the upgrading of traditional industries, enhance the value-added of products, and increase the proportion of high-tech industries, so as to improve China's position in the international division of labor, currently focused on low-end products and manufacturing services (Pan, Liu, & Xiang, 2015). To realize the transformation from labor-intensive to technology-intensive industries, it is necessary to adapt the current structures for the management and training of human resources. This includes expanding the number of students in vocational colleges and schools and improving the employment of their graduates. During industrial restructuring, different industries put forward different requirements for human resource development through VET: For example, advanced manufacturing needs highly skilled personnel capable of cutting-edge technologies and innovation potential; the service industry needs to align more with modern service concepts; and basic, heavy, and hard industries (e.g., coal mining and forestry) need to sustain the appropriate skill-based personnel.

Graduates of vocational colleges and schools are the main source of talent for intermediate and senior technical and skilled personnel in various industry sectors. In 2015, China had a total of 11,202 secondary vocational schools with 16.56 million students, including new enrollments of 6,012,490, accounting for 43.0% of the total enrollment of high school education. It also has 10.48 million college students, accounting for 39.9% of the total enrollment of higher education (Ministry of Education, 2016). The majority of secondary vocational school graduates (57.7%) are employed in the tertiary industry, whereas 20% of graduates are employed in processing and manufacturing companies. Yet the graduates of the processing and manufacturing industry enjoy the highest employment rate (98%). In addition, the vast majority of graduates work and live in urban areas (95.8%), which means that about 5 million young people from rural areas achieve urban employment through secondary vocational education each year. Therefore, VET has effectively promoted urbanization (Sun, 2015, p. 150).

Vocational college graduates show sound development potential in their jobs. Statistics show that the income of higher vocational students who graduated in 2011 increased by 94% 3 years after graduation, and 60% of vocational college students have been promoted within 3 years after graduation. In the past 4 years, the gap between the monthly income of vocational college graduates 6 months after graduation and the income of university graduates has gradually narrowed from 19% in 2011 to 15% in 2014 (Ministry of Education, 2015a).

Currently, Chinese society is experiencing significant demographic changes due to the implementation of the one-child family policy and improvement of people's living standards. The growth rate of China's working-age population during 1985–2007 was 1.58%, and it fell to 0.61% during 2008–2015. According to the forecast, it will further drop to –0.4% in 2016–2020. The declines in the growth rate of the working-age population and labor participation have directly led to changes in the labor supply structure. The labor input growth rate decreased from 1.5% in 1985–2007 to 0.36% in 2008–2015 and is predicted to be –0.9% in 2016–2020 (Institute of Economics Chinese Academy of Social Sciences, 2015).

Since the 1980s, China's large-scale industrialization process has fundamentally benefited from its own favorable population structure. The rapid development of manufacturing is based on highly intensive consumption and utilization of resources, which is inseparable from abundant cheap labor supply. With the gradual demise of the demographic dividend, the Chinese economy needs to transform from traditional extensive growth to innovation-driven and intensive development. With limited labor supply and rising labor costs, the manufacturing sector has to increase the technology level and value-added to promote the development of high-end segments of the value chain. This means that VET needs to satisfy the demands of high-tech enterprises, improve the technical skills of the labor force, and provide qualified high-quality talents for industrial transformation and upgrading. It can be said that in this critical historical period, the development of VET will be central to the aim of achieving smooth progress in relation to industrial transformation.

Political Measures in VET During Economic Transformation

In the last 20 years, the State Council has held four national work conferences about VET. These conferences are an important vehicle for the Chinese government to promote strategic policies in a certain field. The high frequency of the work conferences on VET indicates the high level of importance it is being given by the government. According to the National Outline for Medium and Long Term Educational Reform and Development (2010–2020), developing VET is a major approach to advance economic development, promote employment, and address the issue of underdevelopment in agriculture and rural areas. The Decision of the State Council on Accelerating the Development of Modern Vocational Education System (in 2014) identifies the construction of a modern vocational education system as an important initiative to promote innovation in VET. These documents outline the policy and reform direction for the future development of VET, including facilitating the transition from planned to market-driven provision and from directly government-controlled to employment-directed VET. The key aim of the reformed VET system is to support employment. This means that VET should be reorganized to support economic development and industry reconstruction and be sufficiently flexible, unique, and independent.

Although central government plans the new structures for VET, the system is managed by municipal and county-level authorities, is supported by related social partners, and will thus reflect distinct regional characteristics. The private sector is being encouraged to increase its investment in VET through income tax relief. Social partners and international cooperation are also more involved in VET development. To meet the needs of economic development and optimization of regional distribution of the VET resource, adjustments have been made to the distribution of vocational colleges and schools across the country. For example, training programs in manufacturing are mainly seated in the eastern Yangtze River and Pearl River Delta areas, where the manufacturing industry is concentrated, basically compatible with the industrial structure.

Since 2006, the central and regional governments have increased financial investment in VET on a year-by-year basis. By 2013, funding had increased by nearly five times that in 2005, with an average annual growth rate of 25%. Further funds were also allocated to support the basic capacity building of vocational institutions, the construction of model vocational institutions, student funding, and comprehensive rewards and subsidies. In the field of higher vocational education, the Ministry of Finance and the MoE jointly formulated policies in 2014 to establish a nationwide reform and performance-oriented system of student fund allocation. This is the first regulation with clear stipulation for the funding of vocational colleges, and it applies to all regions.

Since 2009, in the field of secondary vocational education, China has started to implement a tuition-free policy through small-scale pilot projects. This has been extended to all rural students, those studying agriculture-related subjects, and students with financial difficulties in all vocational schools (including public and private schools). VET institutions are building better connections with

enterprises and exploring ways to adjust the structure of their training programs, develop more effective training services, and increase the development of the holistic professional competence, occupational awareness, and employability of their students. Ways to enable enterprises to participate in school management and teaching–learning processes include the following:

- Aligning VET programs and structures to the requirements of local economic and social development and changes in industrial structure
- Exploring different training modes combining working, production, and learning
- Modifying training programs through conducting needs analysis and developing new learning resources
- Reforming teaching methods and teaching arrangements utilizing concepts such as *integration of theories and practices, working process orientation, task-led teaching*, and *project-based teaching.*

Changes to the Private Return to VET

The international research literature provides different views on the effectiveness and efficiency of VET (see Chapter 10 for a detailed review). In this chapter, we now turn to a statistical analysis of the private return to VET based on the Chinese General Social Survey (CGSS), a large-scale face-to-face household survey of the social changes in China since 2003 that provides data on individuals' education background and employment. In Table 25.2, we have selected

Table 25.2 Impact of VET on Employment Possibility and Income Return (2003–2013).

	Employment possibility (IRR)		Annual RoR	
	2003	**2013**	**2003 (%)**	**2013 (%)**
Reference group: Junior high school				
Secondary vocational education	2.31	1.07[a]	13.4	10.0
General senior high school	1.3	0.63	7.7	7.7
Reference group: Senior high school				
Higher vocational education	2.94	1.81[b]	15.8	10.6
General undergraduate education	2.89	2.75	24.0	15.6

IRR, Incidence rate ratio; RoR, rate of return.
[a] Not significant at the confidence level of 0.1.
[b] Significant at the confidence level of 0.05; the remaining results are significant at the confidence level of 0.01.
Note: The annual income variables for 2013 eliminate inflation, taking the 2003 Consumer Price Index (CPI) as the base period. For regression analysis of employment, the coefficient represents the IRR, which indicates how many times the average number of occurrences of an event is compared with the original when the influencing factor changes by one unit.
Source: Calculation by the authors.

the data of urban residents in 2003 and 2013 to analyze the impact of secondary vocational education and general senior high school education (compared with junior high school) and the impact of higher vocational education and general undergraduate education (compared with general senior high school) on employment possibilities, as well as the private rate of return (RoR) with an additional year of education.

Table 25.2 shows that, in 2003, the average employment probability of those individuals who received secondary vocational education was 2.31 times compared with that of those who received junior high school education. The employment probability of those who received general senior high school education was 1.3 times compared with those who received junior high school education. Thus, compared to a general senior high school education, secondary vocational education has a larger influence on increasing employment potential, with junior high school education offering the least potential. But the situation has changed since 2013. There was no significant difference in employment possibilities between those who received secondary vocational education and junior high school education; but the employment probability of those who received general senior high school education is 0.63 times compared with those who received junior high school education where the employment probability reduced greatly.

In terms of income return, in 2003, for those with an additional year of secondary vocational education, the annual income increased by 13.4% in 2013; and, for those with an additional year of general senior high school education, the annual income increased by 7.7% in 2013. The RoR of secondary vocational education dropped to 10%, whereas the RoR of general senior high school education remained unchanged at 7.7%. This shows that in the secondary education stage, the RoR of VET is higher than that of general education, but this advantage is diminishing.

In 2003, the employment probability of those who received higher vocational education was 2.94 times higher compared with that of those who received senior high school education, and the probability of those received general undergraduate education was 2.89 times higher. Higher vocational education shows a slight advantage in promoting employment compared to general undergraduate education. By 2013, the relative promotion effect of higher vocational education on employment had decreased significantly from 2.94 times to 1.81 times, whereas the effect of general undergraduate education had decreased slightly (2.75 times). The main reason may be the hypernormal expansion of higher vocational education, including the number of graduates over a short timeframe. However, the labor market employment structure did not adapt as rapidly in spite of transformation and adjustment. It should be noted that the economy could not provide sufficient employment for graduates, resulting in a difficult employment situation.

In terms of income return, the annual RoR of higher vocational education was 15.8% in 2003, compared to 24% for general undergraduate education. In 2013, the RoR of both declined, especially that of general undergraduate education, but the advantage remained. This shows that the position of higher vocational education relative to undergraduate education has been enhanced during a period of

economic restructuring. The RoR of higher vocational education was 10.6%, close to that of secondary vocational education.

In short, compared to the junior stage of education, both secondary and higher vocational education have had positive impacts on promoting employment and increasing income. The positive impact of secondary vocational school is larger than that of general senior high school, and the influence of higher vocational education is also increasing. However, the weakening of positive effects of VET on both employment potential and income return in recent years is worthy of attention. We now discuss the internal challenges of the VET system, especially the decline of education quality due to the scale of expansion over such a short-term period.

Problems Facing China's VET System

There are still many problems to be solved in China's VET system, which are mainly manifested in the management system, the allocation of funds, the organization of teaching and learning, and the imbalance of urban and rural development.

Management of VET

As was noted in this chapter, central government is responsible for VET policymaking and planning:

- The ministries of education, labor, planning, and finance issue laws and policies to provide guidelines for the implementation of VET at the macro level.
- The MoE develops, plans, monitors, and evaluates VET development indirectly through provincial education authorities.
- The administrative functions of the MoHRSS include the occupational certificate system (especially in terms of occupation classification and examination) at the macro level, and skilled worker schools and vocational training at the level of implementation.

However, the structural imbalance of government functions has been very prominent in practice. First, as can be seen here, VET is administered by two ministries, the MoE and the MoHRSS. Such a dual-administration system and overlap of functions could result in difficulties in coordination, waste of resources, and considerable variations in policy and practice. Second, some functions are absent. For example, the management function of the MoE—the main management body—is mainly reflected in the management of vocational institutions. For industry organizations and enterprises, which play a significant role in VET, the government lacks authority and mechanisms for effective administration.

The management functions of central and local governments and industry organizations are also imbalanced. In recent years, the central government initiated numerous national projects to promote VET. As a result, VET has become more project-oriented, which to some extent weakens the responsibility and capability of local governments. In addition, the management system is very

diverse (i.e., some vocational colleges are managed by the provincial department of education, whereas some are managed by the municipal education bureau), resulting in increased randomness and unfairness in resources allocation. The organizational management competence of local governments in regions with varied stages of economic development is unbalanced, and their capabilities to promote VET development are quite varied.

Investment and Allocation of VET Funding

With the scale of expansion of VET, the allocation of funding has experienced continued growth at all levels, but there is still a huge gap compared with the actual demand. VET is still the least favored element of the education system, despite its scale, position, and role. In 2013, the number of students enrolled in secondary vocational school and vocational college accounted for 44% and 39% of the total number of students in senior high school and in the general higher education stage, respectively. Accordingly, the funding for secondary vocational school and vocational college accounted for 38.2% and 18.2% of the total funding for general senior high school and general higher education, respectively. The funding for vocational colleges and schools at all levels is relatively low, as is the per capita expenditure for students in vocational college. In 2013, the overall budget for education expenditure per capita for vocational college students was only 53% compared to that of general undergraduate students.

The source of VET funding is limited as it is mainly based on two elements: financial expenditure and tuition fees. In 2013, of the total VET expenditure, financial expenditure accounted for 74%, an increase of 29% compared with 2005. As such, VET still lacks a multichannel financing capacity. Due to the lack of a unified and coordinated mechanism for the allocation of VET funding, there is an imbalance in allocations among VET institutions in different regions. For example, in 2015, the financial expenditure per capita of vocational colleges in Beijing was 30,000 RMB, whereas in the middle provinces it was only 2,000 RMB. In terms of regional distribution, the gap among the eastern, central, and western regions is huge. VET expenses are mainly covered by local government. The eastern regions have a better economic situation and abundant local fiscal revenues, hence the financial expenditure per capita of VET is relatively higher. By contrast, the public financial budget in the central and western regions is relatively low. The central government provides more subsidiary and financial support to the western regions compared to the central regions, indicating what has been termed a *central collapse*.

Lack of Teachers, Curriculum, and Teaching Methods

Over the past decade, despite the positive momentum of educational development, reform at the classroom level in VET is still difficult. On the one hand, with the rapid expansion of student numbers, class sizes and teachers' workloads have increased, while, at the same time, the reduced level of teaching resources per student has also affected training quality. Teachers across the country still lack practical experience and competences in spite of the substantially improved level of academic degree holders. Restricted by the existing human resources

development policies in VET institutions, trainers and teachers employed directly from enterprises cannot obtain positions with corresponding levels of status and wages. Many graduates from universities are recruited as teachers without work experience.

Curriculum design cannot keep up with the challenges created by VET developments. The content of theoretical learning has no direct connection with the workplace, practical training focuses on operational techniques and skills, and there is a lack of learning and reflexivity in work processes. The main focus is on the teaching of specific knowledge, rather than an effective and holistic developing of professional competence. Under the impact of traditional Chinese educational culture, teaching and learning arrangements struggle to support the concept of learner-centered approaches to learning. The teaching methods focus on the transmission, reproduction, understanding, memorizing, and testing of disciplinary knowledge. The channels for students to acquire knowledge are limited, mainly relying on the teacher and the classroom. Due to the lack of sufficient practical and reflective learning opportunities, students' comprehensive professional competence cannot be fully cultivated. Unsuccessful teaching practice greatly affects the motivation of teachers, and professional burnout can be easily observed.

The Imbalanced Development of VET Between Urban and Rural Areas

China has a vast territory with unbalanced regional economic development mainly due to historical and geographical reasons. There is an uneven distribution of VET resources across different regions. As a result, the difference in learning conditions between vocational institutions in rural and urban areas and between eastern and western areas has become an acute issue that affects the total quality of VET. The biggest problem here is in the rural regions. In China, the term *rural VET* refers to VET programs at all levels targeted at the rural population. It aims at providing training measures for job preparation and for the on-the-job workforce, and providing diversified training services for the career development and living quality enhancement of rural community members. A number of issues need to be addressed:

- Rural vocational schools cannot meet the needs of social development in terms of quantity and scale.
- Many local government officials have not realized the importance of VET to the development of the economy and the poverty alleviation of rural residents. They are not paying attention to VET and give the priority of education funding to general senior high schools. There is no stable funding source for VET.
- Rural vocational schools are in poor condition. Due to funding shortages, many vocational schools have not (or cannot) set up programs in accordance with market demand. Instead, a large number of low-cost programs, such as finance and management, have been set up, resulting in structural conflicts in the employment of graduates.
- Rural vocational schools face enrollment difficulties. Students learn little from the training they receive, and the employment prospects are poor. These factors then form a vicious circle.

VET's Low Status

In China, much influenced by the Confucian tradition, the social consciousness of underestimating physical labor is deeply rooted. The negative impact of traditional and cultural orientation on education is the most critical problem. As was noted earlier in this chapter, VET is usually considered a "second-class education." According to a survey in the northeast region implemented by the Northeast University of Finance and Economics in 2015, less than 5% of parents would like their children to enter vocational schools, and 7.5% of the one-child parents even believe that going to vocational schools is equal to ruining their children's development opportunities. With the challenge of declining school-age populations year after year, vocational schools are not in the position to compete with general education in terms of enrollment (Sun, 2015, p. 151). Despite school restructuring and other factors, it is an undeniable fact that the proportion of secondary vocational school students in the total number of senior high school education students has decreased year after year (Ministry of Education, 2015b). Private schools have been the first to bear the brunt. In 2015, there were a total of 2,225 private secondary vocational schools, a decrease of 118 from the previous year, and the total enrollment of 709,300 reflected a decrease of 10,200 from the previous year.

Research on VET in China

From a historical perspective, the advancement of research on VET in China has accompanied the establishment of vocational schools. In the 1970s, with the implementation of economic reforms and the "opening up" policy, scholars began to explore how VET might contribute to economic growth. After observing VET developments in Western countries, scholars began to outline a blueprint for China. A lot of achievement at that time came through debriefing those who had participated in study tours in foreign countries. Key research topics include the integration of agriculture development with technology transfer and VET, coordinated reform of the VET system and employment systems, higher vocational education, construction of vocational education clusters and alliances, coordination between research on production processes and teaching and learning, and learning and research. They are being explored mainly through demand-oriented applied research and through studies of VET practice.

Currently, *vocational pedagogy* is a subordinate category under the university research and teaching discipline of *pedagogy* in China. As a result of the influence of the education research culture, VET research is now mainly based on speculation-type approaches. Empirical research, especially using quantitative methods, is still in the early stages. Compared with other types of education, VET is more closely linked to the economy, and it is difficult to fundamentally solve the problems only within a theoretical framework of pedagogical research. Some scholars have advocated the need to establish a special research paradigm and methodology for vocational education (Zhou, 2009, p. 17). It is hoped that this will develop through a conceptual discussion within the community of VET researchers.

The academic status of VET research is relatively low. There is no Chinese VET journal listed in the major scientific literature indexes, and leading universities are generally less interested in VET and training more generally. The same also holds true in teacher education universities. This is related to the absence of engineering, agriculture, and business programs corresponding to VET in most of these universities. Within the subdisciplines of pedagogy, compared with traditional advanced subdisciplines, VET research may provide researchers with fewer academic opportunities, causing young scholars to be reluctant to get involved in VET research. As a result, VET research is often faced with a shortage of talent. Nevertheless, research is taking place. Key topics include the following:

- Improving the relationship between vocational schools/colleges and enterprises, between secondary vocational education and higher vocational education, and between VET and other types of education (Cao & Hongjie, 2014)
- Tackling the separation of the employment and education systems and the separation of occupational qualification certificates and school/college diplomas (Jiang, 2014)
- The development and reconstruction of universities of applied technology through transformation of undergraduate universities, with an aim to achieve diversification of higher education and promote the employment of college graduates (Chen, 2014)
- Consideration of the legalization and governance of VET to improve coordination and sustainability. VET legal research is a dynamic yet young research field, and the concept of "good governance" is gaining ground in the public's attention. In this area, the increased scope and depth of involvement of other disciplines have exerted positive impacts on VET research, including, for example, from sociology and economics (Guo, 2015; Liu & Jin, 2014; Wang, 2015).
- Developing the role of VET institutions in the formation of clusters and alliances between industry and education (Wu et al., 2014)
- Establishing an apprenticeship system through the extension of successful pilot programs (Guan & Weiping, 2014). This involves international exchanges, including the International Network on Apprenticeships (INAP) (Zhao, Rauner, & Hauschildt, 2011), and research on work-based learning in conjunction with the UNESCO-UNEVOC network (Institute of Vocational and Adult Education of Beijing Normal University, 2016).
- Establishing a quality assurance system for VET. Progress has been made with the introduction of quality descriptors for higher vocational education across four dimensions (student development, school management, government responsibility, and service contribution) (Ma & Yang, 2014). Research is also taking place on the professional competence assessment of VET students with colleagues from Germany and South Africa (Zhao & Zhuang, 2013). Results from these international projects are being applied by the MoE in relation to the evaluation of higher vocational education.
- Improving curriculum design and teaching and learning processes. VET curriculum research in China has gone through three stages: (a) courses focusing

on both theory and practice; (b) courses where theories act as a basis for practice; and (c) courses that integrate theories and practice, drawing from concepts such as *learning fields* from Germany (see Chapter 16, this volume). There has been critical reflection over the emergence of technology-driven and hybrid learning methods such as "MOOC fever" and flipped classrooms (Jiang & Xingzhou, 2014; Yang, 2015).

International cooperation is a challenge; however, China has gradually become an equal partner and now sometimes acts as an aid donor rather than, as in the past, an aid recipient. Studies on feasibility, implementation, and evaluation from the strategic point of view are required for planning and implementing a successful VET cooperation project. Currently, there are only a few related studies, the majority of which provide summaries advocating particular approaches from the government's point of view.

There are a large number of Sino-German cooperation projects. Liu and Bangchun (2012) have found that funding is no longer the primary influencing factor for project implementation. Instead, understanding the expectations of policymakers and making the most of cross-cultural competencies are key determinants of successful cooperation. The future focus of international cooperation in VET needs to be on capacity building, rather than importing models from other countries (Zhao & Xu, 2008). This will include more studies on exploring issues of concern in the joint programs, when both cooperation partners set out to achieve their own aims and objectives (Chen & Hong, 2016).

Conclusion

The speed of economic development is currently slowing in China. Economic transformation and the transition of the existing industrial structure require the upgrading of human resource development. Further development of VET is required to be adaptable to enable the transition of traditional industries to high-tech alternatives, and to meet the newest qualification needs. On the one hand, it requires the government's optimization of governance by improving relevant laws governing VET and administrative efficiency. It also requires reform of the educational and financial systems, with positive encouragement for and guidance to industry and businesses regarding their involvement in VET. On the other hand, vocational institutions should strengthen their links with industry and business, be market-oriented, and identify a proper development strategy based on their situation to improve education quality.

Given the impact of the decrease in the school-age population and the lack of students in vocational institutions, the development of a modern VET system should eliminate the barriers between VET and general education, and change the educational model from knowledge-oriented initial education to lifelong learning, including on-the-job training and re-employment training, in order to meet the requirements of a "learning society." To meet the needs of social development, measures in response to local conditions should be taken, such as strengthening the regional layout of VET institutions and programs, improving

the efficiency of education resource allocation, updating curricula by drawing on the findings of effective approaches from different pilot programs such as task-oriented learning (Howe, 2008; Xu, 2009) and work-process-oriented curricula (Jiang, 2007; Zhao, 2009), and expanding learner-centered approaches (Zhong, 2001).

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26

Working with Historical, Cultural, and Economic Logics: The Case of Vocational Training in Argentina

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Introduction

In recent years, vocational education and training (VET) has been the subject of renewed interest in international debates on economic development. This revalorization goes hand-in-hand with an ongoing and ever-changing discussion about VET's role and function in responding to the challenges of providing training to match the new demands of the world of work and, at the same time, to be relevant for local development and the career paths of underprivileged populations, including low-skilled workers, young people, and migrant populations.

   VET field is a heterogeneous compound of public and private actions, often in alliance among themselves, sharing interests that are sometimes complementary and frequently contradictory. Also, from an institutional viewpoint, VET is probably the most heterogeneous of the main education and training sectors, with structures and types of provision occurring simultaneously (Cedefop, 2017). This chapter seeks to contribute to these discussions about new models, functions, and formats of VET in the context of a developing country, Argentina. In the Argentine case, vocational training (VT), strictly speaking, is a terminal program, which does not provide access to higher education. It is different from the so-called technical pathway, which is provided in formal secondary and tertiary education, and which provides access to a higher level of education. These two pathways compose what is generally known as VET, but this chapter will focus on the VT pathway. VT is divided into two streams: (a) a stream focused on initial training (but does include continuing training) for labor market entry, and (b) a stream that is more flexible and closer to the world of work and the lifelong learning paradigm. The key difference between the two streams is that the first is related to educational policies and the second to employment policies. These two streams often overlap and compete one another, but they also respond to different demands and clientele.

The chapter's analytical framework is based on Raffe's (2008) important contribution of the concept of "logics" to debates about education-to-work transitions. He highlighted how variations among countries could not all be attributed to differences in economies or to differences in young people's social or educational backgrounds. He argued that, at least in part, these variations reflect institutional and structural arrangements in education and in the labor market, which create these different national logics. In the case of Argentina, this concept allows us to identify "logics of VT" based on the combination of different dimensions (Jacinto, 2015). The main focus will be on institutional and structural arrangements, identifying the key actors in terms of their key functions in relation to the phases of each historical milestone and the policy cycle of the 2000s. The dimensions analyzed include the purposes of VT attributed by the legal framework; functions and objectives; actors participating in the definition of the supply of VT programs, and the role attributed to each of them; institutions providing VET; the type of training provided (initial/continuing, based on formal subjects/flexible, or based on occupational families or on skills) and how to recognize them; and the target population.

VT in Argentina is, on one hand, a result of a historical construction and, on the other hand, a field that has been strongly redefined during the first decade of the 2000s. This redefinition was a response to the demands and interests of social and economic stakeholders in the sociopolitical context of the period. The roles and different functions do not comprise a harmonious, integrated system, but a complex amalgam of public and private actions responding to different demands and segments of the labor market. So, as it may be seen, logics interact with one another by complementing, overlapping, and operating in parallel, reflecting tensions and contradictions.

The chapter begins with a historical overview of how these logics have been developing in Argentina. Against this background, recent changes are analyzed in greater depth together with the reconfiguration of these logics. The purpose is to show how economic, political, and social demands have reshaped VT along different sociohistorical periods, analyzing especially recent reconfigurations of the mentioned logics. The chapter draws on data from documentary and statistical materials and from two qualitative field studies coordinated by the author for details, see Jacinto, 2014; Lolwana, Ngcwangu, Jacinto, Millenaar, & Martin, 2015. These studies were based on semistructured interviews conducted with social stakeholders, including civil servants, corporate associations, trade unions, human resources management, and social organizations, between 2008 and 2014. The interviews focused on capturing the stakeholders' conceptions of VT and their positions regarding existing policies and emerging legislation.

The Competing Logics of VT

Both VET and VT have become increasingly associated with both the social, professional, and personal promotion of individuals and with productive development. Challenges related to the social agenda, such as promoting active aging, combating social exclusion, and increasing social cohesion, add to those related

to economic development, such as adjusting the offer of skills, encouraging the capacity for corporate innovation, and promoting growth and productivity (Cedefop, 2010). More recently, due to the requirements of lifelong learning, VET has been diversified with new institutions and stakeholders involved, particularly expanding to higher education areas.

Bates, Hodkinson, Unwin, and Young (1997) argued that VET research needed to refocus on democratic and social justice imperatives as distinct from the economic imperative—which, they argued, had become dominant in policies and discussions about postcompulsory education. More recently, McGrath (2012) examined the implications for VET of recent trends in thinking about development through the exploration of three particular theoretical approaches: human rights, capabilities, and integrated human development. He concludes by considering the purposes, natures, and possibilities of VET as a means of human development. Tikly (2013) also argues for the relevance of the human capability and social justice approaches for understanding the role of VET in development. Drawing from the works of Sen (1999), the human capabilities approach emphasizes the role of education even at a minimum level as necessary for achieving human capabilities. This approach is closely aligned to a social justice perspective, which aims to put the needs of people first, rather than the demands of the economy.

In Latin America, during the 2000s, a new paradigm of comprehensive social protection related to social justice emerged. The perspective of social protection was applied to the coherence and coordination of policies at national and local levels (ECLAC, 2013). In the case of Argentina, employment and training policies as well as social policies were being conceived as the way to install new forms of social protection. In the social protection approach, training for work is not considered as training alone, but as a set of combinations of mainstream education, nonformal and informal education, and work-based training, including vocational guidance and life skills. However, it should not be ignored that these multiple roles and functions attributed to VET do not work in a vacuum in each national context. They have been built throughout historical processes and are not part of a coherent whole, but rather in tension and constant change. There is a long way between the perspectives that fuel the redefinition of roles and functions, the actions designed, and their effective implementation.

All of these dimensions and their articulations have, in principle, allowed an educational logic and a labor-productive logic to play a role in the structuring of VET (Verdier, 2008). The educational logic gives a central role for educational institutions in the provision of programs, with school-type certificates recognizing acquired knowledge and, eventually, providing skills for further studies at a higher level. The population of a country accesses VET according to certain previously established educational criteria, or gains direct access to VET. In the productive logic, VET assumes a role in a professional community from both the point of view of the stakeholders in the world of work (trade unions, companies) and that of the target population (workers). Within this logic, certification is demand-driven. A bridge between working needs and productivity needs to be built. The tripartite dialog (between the state, corporations, and trade unions) is

an instrument frequently used to negotiate this type of training. Obviously, this productive logic represents a tension of interests between the two opposed stakeholders: one representing the capital, and the other representing the workforce. The state participates in this dialog as a regulating authority, according to sociopolitical alliances and orientations, in such a way that the emphasis on productivity and/or the workers' welfare may vary from a relative consensus collectively negotiated to the imposition of the stronger party. These two logics prevail in the analyses of the institutional linkages between education and the labor market. For example, Iannelli and Raffe (2007) suggested that in systems with strong linkages, VET follows an employment logic, and in systems with weak linkages follows an education logic. We argue, however, that the educational and labor-productive logics are not the only ones. In recent decades, there has been a strong diversification of the roles and functions of VET in different societies, including in Argentina. A new "social logic" has emerged.

Historical Milestones in VET and VT in Argentina

In this section, I will explore the development of VET in Argentina through the lens of three historical phases:

- From encyclopedic knowledge to the learning model
- From the valorization of "work and the worker" to human resources training
- From the segmentation of VT to compensatory social logics.

From Encyclopedic Knowledge to the Learning Model

In the last decades of the nineteenth century in Argentina, a model of academic education prevailed based on the French system. A difference between technical education and VT was established early on: Whereas technical education was understood as a responsibility of the state, the specific training of workers (VT) was considered a responsibility of industry (Pronko, 2003). The historical development of VT in Argentina has been weak, in view of the primacy of general and academic education. Due to the early expansion of primary education, poor industrialization (mainly concentrated in the food and textile sectors), relatively traditional productive technologies, and the weak organization of activities in the world of arts and crafts, work-based learning was deemed sufficient (Tedesco, 2012).

Training in the trades was supported by different popular and philanthropic organizations, and by early trade unions, as well as groups of anarchists and socialists. In the early discussions on VT toward the beginning of the twentieth century, the dominant elite (like the landowning oligarchy, who also owned the political power) regarded it mainly as a "socio-political control instrument," as a way to "pacify" the working class, and as a channel to divert the middle classes aspiring for social promotion and political participation from humanistic education (Oelsner, 2010). Apprenticeship was the main type of VT until the 1940s. However, it had a relatively short history, unlike in other Latin American

countries where it is still in force. It was created in the 1920s as an on-the-job training pathway aimed mainly at adolescents, and was based on the traditional model of the teacher–apprentice.

From the Valorization of "Work and the Worker" to Human Resources Training

A second landmark in VT in Argentina occurred during the 1940s, in connection with the industrialization process, which had been triggered by the threat to imports during the First World War and strengthened by the end of the 1930s. With the introduction of protectionist policies, the world of work and the organization of workers underwent a big transformation. It was then that VT was regarded as necessary for productivity and workforce development. Thus, VT was consolidated in a defined position aimed at individuals who had completed their primary studies (or even at those who were still studying, in the case of those older than 14 years).

Urban work positions were no longer only being filled by qualified immigrants, but by internal migrants from rural areas. The new technical requirements across industry implied workers needed a level of knowledge of trades and specialties that could not be acquired only in the workplace (Martin, 2010). The creation in 1944 of the Comisión Nacional de Aprendizaje y Orientación Profesional (National Commission for Vocational Education and Training) installed a new configuration of VT, which provided a role in labor relationships and strengthened the social dialog. In this period, trade unions took the role of mediators with the state for the defense of their interests. Thus, decision-making spaces and tripartite management spaces were organized (between the state, trade unions, and corporations), which included training-related issues (Spinosa & Testa, 2009).

The remarkable feature during this period is that the development of VT was strongly influenced by both economic and political factors. A positioning of the Labor Party (*Partido Peronista*) based on the upward mobility and the promotion of manual workers led to a close relationship between the expansion of the political base and the need to generate a source of supervisors and manual workers. The latter were trained through nonformal VT courses and with a strong trade union involvement in their management. The developmentalist ideology and theories about human resources planning would permeate through the 1950s to the end of the 1960s (see also Chapter 4, this volume). The Consejo Nacional de Educación Técnica (CONET) (National Council of Technical Education) was created to consolidate the difference between technical education and VT. Although an impetus was given to technical secondary education, support for VT decayed.

In this way, VT courses were oriented to the continuing training of adult workers, and the apprenticeship model in the workplace was abandoned. It was not until 1974, with a new Peronist government, that the Dirección General de Formación Profesional (General Department of Vocational Training) was created. This had the same status as the agency in charge of technical education. In this period, vocational training centers (CVTs) were founded. Initial VT aimed

at adolescents who had dropped out of formal education was created alongside the traditional adult training; it provided some basic training in language and mathematics, apart from the VT itself.

From the Segmentation of VT to Compensatory Social Logics

The third milestone can be situated from the end of the 1970s and the beginning of the 2000s. In the 1980s, dictatorship eliminated one of the main financial sources of technical and VET from a tax paid by industrial companies (known as the *payroll tax*). This meant a big blow to technical and VET because the important contributions coming from those big companies disappeared. However, the so-called Tax Credit Scheme was created as tax relief for companies investing in VET, and it is still operating today practically unchanged (Judengloben & Gardyn, 2009). All this coincided with the beginning of strong deindustrialization and a free trade approach. VT remained practically restricted to the educational sector, and was not "close to the labor market." In spite of the low demand of the productive sector, however, it kept on growing thanks to workers in the informal labor market who demanded training to enable them to be self-employed. VT was considered as nonformal education until a law on technical education and VT was established in 2005. Most of the VT courses depended on the education system and repeated year after year, responding to a spontaneous social demand. Two phenomena accompanied this process: (a) restrictions on the trade union sector, and (b) the fact that formal companies had started to organize their own in-house training. VT started to be considered almost exclusively as a deteriorated part of the school system, where the important thing for VT personnel was to keep a place in the budget and have students enrolled (Gallart, 2003). Apart from informal workers, VT also sought out young people who stopped attending or dropped secondary education and looked for professional training. In spite of its dubious quality and the distance from the production standards of the big companies, the role of meeting the social demand started to be recognized as being relevant to the career path of informal workers. VT was seen to have a strong link with local development and have relevance for populations living in poverty conditions.

In the 1990s, within the framework of a strong modernizing and neoliberal government with a focus on big companies, changes introduced in work organization models were supposed to overcome the tension between "educating for work" and "educating for citizenship," at least theoretically speaking (Tedesco, 2012). Supremacy was clearly installed in the academic secondary education as the best model for training both for work and for citizenship. The government and the economic elites, but also an important section of progressive intellectuals, supported that position. At the same time, a process of deindustrialization took place. Both phenomena resulted in a new marginalization of technical education and, moreover, of VT within the education system.

Concurrently, as a part of a decentralization process, at the beginning of the 1990s, the governance of academic and technical secondary schools and CVTs was transferred to provincial governments. However, they did not have the technical capacities, let alone the resources, necessary to manage them. Just as

technical education tended to include a high amount of general content, VT also strengthened its "school" model by establishing new enrolment requirements: Now, a trainee had to be 16 years old and hold a basic secondary-level diploma. This decision meant that those young people younger than 16 who were dropping out of lower secondary school did not find a VT institution that could incorporate them.

However, the fact that the neoliberal government was of Peronist origin (between 1946 and 1955, a Peronist government had established a corporatist alliance with organized labor through the unions) meant it brought trade unions back again to the VT stage. At the same time, the neoliberal government consolidated this power—edging out and suppressing, for instance, unionists from anarchist traditions. CVTs, in partnership between the state and civil society organizations (mostly unions and Catholic Church institutions), were created based on an agreement at a provincial level. Teachers' and instructors' salaries were paid by the state, whereas supplies, equipment, and relationships with the world of work were the responsibility of the partners. In 2008, about 40% of CVTs were run by partnerships (Jacinto, 2010). Thus, an internal segmentation started within VT since the nonpartnered state-run CVTs used to have fewer resources than the centers in partnership. But, in general terms, VT continued to be a marginal sector within the education system, independent from the rest of the tracks, and characterized by a lack of resources and the limited training of its teachers (Spinosa & Testa, 2009).

By that time, the state started to develop active employment policies, parallel to formalized VT. This assumed a new type of *social* logic, oriented to those excluded from the job market (the unemployed, nonqualified youth, and poor women). These policies, dependent on the Ministry of Labor, Employment and Social Security (MoL), posed a critical vision of the VT educational offer under the argument that it was far from the demands of the labor market. Hand-in-hand with the recommendations of international credit agencies, it was argued that there was a need to develop new private actors that would adapt to a VT model based on skills demand. This model should be flexible, meet the specific needs of workforce training, and, above all, be implemented through private stakeholders. To that end, courses were put out to tender, creating new private bidders, financed by the state, but concurrently with the regular educational offer. However, these private actors were far from consolidating a new model. As a result of the limited structural nature of the policies, and of the social and economic crisis that occurred, in general, these private centers were ephemeral and discontinued, and the impact on young people trained was far from giving them access to decent employment (Jacinto, 2010).

Therefore, segmented logics within the world of VT itself were being consolidated. These segments can be classified in four ways:

- First, in-company training was addressed to high-qualified levels and competitiveness, based on companies' own criteria and demands. This represented the productive logic. Gallart (2003) points out the strong segmentation among companies: (a) Some were foreign-owned, with training patterns developed abroad and for which volume and implementation capacity were defined by

themselves; and (b) some were medium and small-sized companies that had great difficulty with identifying their own needs, articulating training demands, and financing themselves.

- Second, free public education was offered through CVTs under provincial ministries of education, oriented to low-income sectors, with free courses and weak linkage to the quality job market. This represented the educational logic.
- Third, public, free, *demand-driven* courses were addressed to social and employment recipients. These courses were skills-oriented, short, and flexible, and they were offered by different private stakeholders, including civil society organizations (CSOs). This represented a kind of social logic (compensatory), but at the same time it intended to bring a new employment logic to VT provision.
- Fourth, paid private provision was also accessed by low-qualified sectors in general, with limited regulations on which there was little information.

To sum up, in Argentina, the *educational* and the *employment/productive* logics (and their different facets) have crosscut most of the twentieth century. Together with the employment crisis of the 1990s, another logic of VT emerged in public policies. This proposed to compensate the situation of unemployed workers and specific groups undergoing employment issues, such as women and youth. This social logic tried to remedy a situation of social disadvantage and/or aim at a higher equity value. When emerging in active employment policies, the *social* logic oriented toward training in a trade as a means to contribute to *employability,* defined as the capacity of an individual to get or keep employment. In the neoliberal context of the 1990s, this logic was especially based on an individualizing conception about employment issues and emphasized the offer of flexible courses, with the intention to be adapted to employer demands.

The three logics have progressed in parallel, even overlapping at the same time, as will be seen in this chapter. But, concurrently, they were reformulated hand-in-hand with the new orientations toward social and productive development adopted during the 2000s.

New Perspectives in Educational and Labor VT-Oriented Policies

The educational logic of VT re-emerged in the 2000s after suffering a long absence of physical, human, and management investment. Diagnosis carried out in the middle of the decade conceived VT as a series of nonorganized activities in a system incapable of articulating criteria, scope, forms of recognition, evaluation, and certification of knowledge, and unable also to classify degrees, plans, grading, and certifications obtained. Fragmented and segmented, a high student drop-out was observed as well as courses in areas closer to nonformal or social education rather than VT. Likewise, it had low visibility and/or status in the corporate world, and a limited involvement in collective labor agreements (Jacinto, 2010). Teachers were lacking training and/or experience in the vocational activity they were responsible for, and there were no systematic plans or programs for updating their expertise. The picture was completed by the existence of training centers with a highly heterogeneous technological estate and access to educational resources and supplies.

The economic crises at the end of the twentieth century and the beginning of the 2000s increased unemployment and brought further employment challenges. The flexible programs introduced by the MoL in the 1990s were interrupted, and emergency social programs were created. In 2003, the adoption of a new economic development model based on the generation of employment was reflected in the improvement of productive and labor indicators. The decade was characterized by important GDP growth and by the recovery of some fields oriented to the domestic market associated with the increase in demand. This economic reactivation was supported by a beneficial international situation with regard to the price of commodities. But economic growth slowed down by 2011. It is said that although the economy registered some growth, the productive profile was not modified in structure, nor were the characteristics of Argentina's place in the worldwide market. The intense process of concentration and globalization of the economy, which was first observed during the 1990s, became deeper during the 2000s, creating inflation. As a consequence, there was a growth period but with no sustainable development.

In the public sector, based on surpluses, social expenditure increased and projects dealing with productive development and infrastructure were developed. At the same time, technological and communication innovation had an impact on the reorganization of labor, especially in certain productive sectors. In some sectors, all this resulted in an increase in the requirement of technical profiles and of skilled operators, whereas a secondary education degree was necessary—but not sufficient—to access decent jobs (Filmus, Miranda, & Otero, 2004). In the social field, the legislation protecting employment was recovered and policies have been assumed with redistributive purposes, based on a perspective to extend social and civil rights. Education and employment policies started to be framed within a new social protection model, going from the "human capital shortage" approach to a "rights" perspective.

Argentina has free public education at every level, but the private sector participation in education is increasing (Rivas, 2010). The private sector covers 30% of student enrollment, with most students attending institutions run by the Catholic Church. The students of private education come not only from the middle and upper classes, but also from the lower classes eligible for state subsidies. In 2006, secondary education became compulsory. It was promoted through mainstream education or through alternative paths. Many measures, including scholarships and a "one laptop per child" program, were oriented to promote retention. The Young and Adults Education initiative developed a set of policies aimed at supporting the completion of the compulsory education of young people and workers in educational and employment programs. This initiative, developed in Argentina and other Latin American countries such as Brazil, is an integrated approach to the education of young people and adults, which takes the form of specific schooling geared to the population aged 18 and older. It is implemented through decentralized structures. Following this pathway, people can obtain their primary and/or secondary diploma. In view of these inclusion policies, was there a new VT model that reasserts previous logics? What were the roles of the different social actors in this reconfiguration?

An important milestone in the history of recent VT appears in the enactment of the law, which classifies VT in the framework of technical and vocational education and training (TVET). This law created a National Fund for technical education and supported the implementation of the Institutional Enhancement Plans. In addition, the Federal Council of Education-to-Work has been created, which discusses the curricula and institutional models. VT is now defined as follows:

> Vocational training is the set of actions with the purpose of providing a socio-employment training for and at work, addressed both at acquiring and improving skills and at requalifying workers, allowing *harmonizing social, professional and personal promotion with the productivity of the national, regional and local economy*. It also includes specialization and strengthening of knowledge and skills at the higher levels of formal education. (Ley de Educación Técnico-Profesional [2005], Law No. 26058, emphasis added)

This definition covers different logics, including both the social logic and the requirements of the productive system. Initial VT programs are to be initiated through the National Education Council (whose members are the 24 provincial education ministers). To be financed by national educational policies, VT centers should belong to the Federal Registry of TVET Institutions. Another indicator of the educational logic of the conception of VT in this law is that *continuing training* is defined in connection with the previous acquisition of the initial training certificate. In fact, the National Ministry of Education (MoE) orients the policies and supports the initial and continuing VT based on families of professions.

Did this mean the longstanding distinction between technical education and VT had been dropped? No, because it was not the only approach to VT in public policy. The MoL also provided financial backing for courses in the context of the National Continuing Training System. These skill-based courses can be taught in the same training centers in which those of the MoE are delivered, but they are shorter, more specific, and more linked to skills profiles than those of the MoE. Continuing VT (promoted through employment policies) is based upon a tripartite dialog through sectoral agreements. Simultaneously, the social logic focused on the promotion of unemployed workers and low-skilled youth continued, but it was now based on the conception of rights instead of compensatory approaches.

Was it only a change in the discourse, or do the approaches vary? Some key differences can be seen by comparison with the compensatory logics followed during the previous decade. In a reactivated economy based mostly on commodities, construction activation, and internal demand, the training actions were defined sector by sector in the social tripartite dialog. It was mostly addressed to unemployed workers (75% of the trainees were in this category) but defined in sectorial frameworks. There was also the aim to allow individuals to follow a training pathway during the period that the person is participating in a specific employment-related program.

Additionally, social movements and civil society organizations were included in the concerted training actions. The reformulation of the social logic in the 2000s not only resulted in aiming policies at individual unemployed workers, youth, or female heads of households, but also were a means of satisfying the social demand organized through movements and actors of the civil society. Several public programs were aimed at strengthening the training of these groups (among other dimensions); in general, they were CSOs and social movements with a territorial identification. These groups also benefited from support for the generation of cooperative social undertakings. Therefore, the compensatory social logic was reformulated toward a *social protection* logic based on the rights and empowerment of social movements in the framework of a social economy. This may be seen, for example, in the fact that part of the courses financed by the MoL were aimed at beneficiaries of the Ministry of Social Development through the inclusion of an important initiative called Argentina Trabaja ("Argentina is working") that financed cooperative members. Within this context, there was an attempt to consolidate different policies into the same entity: thus, an individual who benefits from a minimum income program was entitled to access training courses, self-employment experiences, and/or education for youth and adults. The aim was (with relative achievements) to integrate policies that allow access to different opportunities for an individual and/or population groups. Although the population groups targeted are integrated with the same centers, they don't receive the same courses as the workers included in the sectoral courses and the impact on their career paths is less clear. Despite this, there are some indications that these courses may be significant in their trajectories. Studies show that, if they have previous work experience and finished the secondary level of studies, they manage to get better formal employment opportunities than the ones who were previously less skilled (Ferraris and Jacinto, 2018).

Even if it was a dynamic decade in terms of new VT regulations and investment, the two policies of the two ministries continued to overlap with no dialog between them, showing different conceptions of VT. There were still gray areas in terms of the policy powers and scope of each ministry or department—particularly those concerning continuing VT—and with a strong degree of parallelism: two structures for VT centers, two mechanisms to coordinate the curriculum with the same stakeholders (trade unions, companies), two forms of institutional quality evaluation criteria, two financing sources, and different assessment plans to improve the same institutions. This showed not only a continuous traditional tension between the world of education and the world of work, but also the different ways in which they perceived the redefinition of VT.

The comprehensive idea of social protection would imply moving forward to the upgrading of VT in the social dialog, but this aspect progressed slowly. In the qualitative studies mentioned at the beginning of the chapter, a respondent representing the public sector said, "It is only now that training issues are regarded as something that has to do with the worker identity, the category of the agreement." However, the subject is not free from contradictions among the trade union stakeholders themselves, who do not want to put at stake the skill structures associated with salary or flexibilization. On one hand, there is union

support for and participation in VT actions (with the MoL), job training actions, and those related to the certification of knowledge for workers within a competencies approach (with the MoL). But, on the other hand, unions defend the grading structures associating hierarchy, salary, and knowledge as being the keys to collective bargaining.

Reconfiguration of Stakeholders and Their Conceptions About VT Policies

The period described above was characterized by the transformation of the social dialog that negotiates training. Old stakeholders acquired new roles, and the participation of new stakeholders was promoted. Trade unions participated in a historical and strong political alliance with the Labor-Peronist government, gaining great significance in extending training actions and expanding VT centers. As a particular trait of the Argentine case, the strong presence of trade unions is connected with probably the most articulated and strongest part of VT. They also handle considerable resources of other government departments and/or those connected with public investment projects that place them in a dominant position as a stakeholder who legitimately struggles for a status of privilege in VT. Their resources for VT actions come from various ministries to which they add their own resources, because each union collects around 3% of the employers' contributions for every declared worker. Also, they are part of large public programs of another nature, for example in road constructions and/or housing, where they receive considerable resources. Some big trade unions (the construction industry, janitors, the metallurgic industry, and the food industry) have their own network of training centers (with a model partnered with the state), including technical schools and even tertiary-level institutes and a university. They aim at an integrated training system and play an important role as certifying authorities, in some cases associated with corporate chambers. Big trade unions participate in the three main logics already mentioned in this chapter, and in the actions financed by the ministries of education, labor, and social development. This is mainly evidenced in VT centers partnered with trade unions. They seem to augment the coordination and coherence of different logics in these institutions. They provide initial and continuing VT, financed by the MoE, and short courses financed by the MoL within the framework of sectoral agreements. But, as interview data show, trade unionists make a distinction between "what should be done with workers" (in the framework of a dialog) and "social" courses for the unemployed. This was revealed in interviews. One trade unionist argued that "aiming at the social inclusion is not taken for granted, but according to us it is something that has to do with another field. We are training for the job, at the workplace and according to trade union guidelines. This is not a training for positions that do not require any skills." Talking about the different logics, pragmatically, another trade unionist said, "We use what suits us best," whereas another one said that the sector was a "player who starts matching the parties on the ground," the parties being from the educational, employment, and social fields.

Big companies contributed to the VT debate with two different strategies. First, in some cases, they promoted the continuing training of their own workers facing technological and productive innovations funded with tax credits. This is based on employment logic. Second, within the framework of the political dialog with the government, their participation was bound to corporate social responsibility actions that may have been far from their own requirements of workers, but could eventually contribute to their supply chains of small and medium-sized suppliers and/or local communities. Partly, it is a sort of social logic, but mixed together with an employment logic. They choose in these situations the most *employable* among the social recipients. The number of social recipients (mostly young people) trained in this type of VT action is less than the 10% of the ones who had been trained.

Among the new stakeholders, social movements and CSOs gained importance. Social movements have been the main figures of big mobilizations in the years of the big economic crisis at the beginning of the year 2000, and, because they are also the political support of the government, they claimed a participation in continuing training actions in the programs for vulnerable groups. CSOs, both technical and territorial, have also played a role in continuing training. These new actors participated from a social protection logic: Oriented toward vulnerable groups in marginal neighborhoods, they provided guidance actions and bound together beneficiaries of cash transfer programs with VT courses addressed to freelance professions in the informal sector of the economy.

As a whole, VT continued to be highly segmented, as a reflex of the segmented economy and educational system. VT with an educational logic is articulated around a perspective where the clientele seeks to consolidate as self-employed, in general, and in many cases within the informal sector. Three further logics based on employment could also be detected:

- Social logic (based in this case on the social protection model), which delivered skills-based courses addressed to the unemployed on the framework of other protection measures
- Tripartite-sectoral logic, which encouraged skills-based courses designed together by trade unions, companies, and the state. This logic could establish a virtuous circle for short-term training tailored to the labor demands of formal sectors of the economy.
- Companies' internal training logic, in some cases financed by public funds via tax credits.

The qualitative studies referred to at the beginning of this chapter shed light on the conceptions and definitions of VT from different stakeholders, and the tensions among the different logics (Jacinto, 2014). Although no respondent objected to the definition of the TVET law (which was read during the interviews), it was considered by some to be "comprehensive," but by others as "not clearly defined." Rather, respondents expressed a detachment from the definition, which they considered to have been "a negotiation to include everything and not leaving anything aside." In effect, although the big boost to VT policies was recognized, respondents classified their roles in one of the logics mentioned: educational, productive, and/or social. This classification seemed to reflect

different segments of VT, because they claimed to know little about what the law considered as *vocational training.*

In this way, from an educational logic viewpoint, a difference between VT and job-training short courses could be seen to be developing. An education stakeholder claimed,

> Just as we could agree to institutional and curriculum elements for different technical education components, we could not still find which is the outline of VT within the education system … because everything is mixed up. On the one hand, a short job training, on the other hand, vocational training, and finally, other courses that we do not know what they are. Courses covering 30, 40 hours, which are certified from the MoL and organized by trade unions *sometimes cannot be considered VT*; they are said to be part of a pathway … the pathway is something existing in theory, but not in the real life of workers. We do not define VT as a training for the position, but for the employment.

In view of this interpretation, trade unions and civil servants connected with the world of work counteracted with views such as the following:

> Training should be flexible, discussed in a tripartite dialogue, and an educational curriculum should not prevail, nor a certain number of hours per course should be covered, but meeting the demands of the productive process and of the workers themselves.

But the employment logic takes other variations when defined from the corporate world viewpoint. In fact, respondents from human resources areas of big companies considered training as part of the education strategy of their own human resources. They claimed, in the words of one respondent, that "in general, companies do not recognize the state as a mediator for VT." Whether they sometimes participate, for example, in tripartite productive councils organized by the MoL or not, companies carry out their own training. According to an MoL study (Soto, 2007), about 5% of the EAP received in-company training. This goes from one side to the other of the occupational structure, although it is strongly oriented toward medium- and high-ranked positions. According to a stakeholder:

> [T]he operator seeks a certification of his skills from the world of work. Why—because if not he becomes jobless, he is going to seek employability, and the employability is granted by the certification of the sector. For example, he is an electrician. When he looks for a job he is asked: "where did you study?" "… I studied at the Otto Krause school, but I have the certification from Ford. I am an electrician with a competencies certificate from Ford."

From this perspective, VT certification should be that effectively recognized by the labor market.

In summary, the old idea of the confrontation between the educational logic and the productive logic is limited for understanding the array of logics at stake that build the VT field as a social space for action and influence. The interviewees remarked that the emphasis on an educational logic was associated with a structured offer, permanent but strengthened, and an employment logic that stressed different questions: (a) the tripartite dialog and the key role of the trade union, (b) the intracompany productivity, and (c) social inclusion through attention to beneficiaries of employment plans and vulnerable groups. Having said that, respondents' views did coincide in relation to a critical diagnosis regarding the conflictive articulations between the MoL and the MoE guidelines, which came to be considered, in the view of one respondent, as "obstacles to the development of policies for the sector." Divergent positions between the MoL and the MoE were present in the very testimonies of civil servants, according to the respective government area. The points in tension were related to the key issues of the organization of VT (i.e., the organization) into an education and labor system, their dependence, and who would be the holder of the certifying role. On one hand, education officials maintained that the education and labor system should be under the MoE, using the concept of *professional families*. Certifications should be based on the training levels organized according to longer and more formalized training tracks. Also, they seemed to be skeptical with respect to curricula designed and structured in short and modular courses. In addition, the MoL considered that they were the most relevant for managing the VT system, because it is considered that the subject falls within their responsibility, crosscut by the stakeholders and dynamics of the labor market.

Conclusion

This chapter has used the concept of educational and employment logics to analyze the development of VT in Argentina, which initially grew from the world of work. As early as the 1940s, a strong political alliance between the state and trade unions gave a new boost to VT, accompanying the process of substitution of imports at that time. By the mid-1950s, an educational logic emerged that has persistently been maintained. The introduction of a social logic appeared in the 1990s hand-in-hand with compensatory programs to fight against poverty, unemployment, and precarization when "exclusion" emerged as a social phenomenon. Concurrently, large companies at that time started to develop their own training systems, particularly oriented to medium- and high-ranked positions in the workforce. This last process has developed to such an extent that, when asking those responsible for human resources, they did not recognize VT offered by public services. These logics, which have overlapped and also been in tension, often involved the same social stakeholders, although the clientele they trained and their relationship with the world of work were strongly different.

In the 2000s, there was an important reconfiguration of these logics. First, the role of trade union stakeholders in the field of VT was strengthened. Second, the introduction of a "social protection" perspective in public policies produced a turning point due to the creation of important public funds in the area and the

recovery of the central role of the state in processing demands for VT. But this reconfiguration also developed parallel to the educational logic. In initial and continuing VET with educational logic, a curriculum homologation process started at a national level together with a homologation of resources for institutional strengthening. Slightly less than half of this provision is carried out in alliance with other social stakeholders, such as trade unions and ecclesiastical organizations.

In continuing training with an employment logic, the reconfiguration placed stakeholders in an extended social dialog and conceived the target population as workers (unemployed, active, or under training). VT was conceived as part of a social protection system, associating it with universal grants and providing guidance and establishing bridges to employment. Particularly, these processes were developed in alliance with trade unions and partly with civil society organizations (and with social development organizations). In response to the pressure of different social groups, and its own political conceptions, the state developed various logics, which have often been contradictory and overlapping.

In this historic development, recent contradictions in the configuration of a VT policy are part of long debates, but with new reconfigurations. Old stakeholders, such as trade unions, and new stakeholders, such as the social movements, participate in different segments of VT, and sometimes they do not even recognize each other. However, in certain cases, they work in alliances that overcome historical contradictions. The reconfiguration of the field of VT in the 2000s has been at the core of job-training policies that accompanied employment growth (although formal employment increased only in certain sectors) and the promotion of the best way to produce goods and services based especially on sectoral projects. Investment, quality improvement, and institutional strengthening were framed in a logic of VT as an acquired "right," although tensions and contradictions still persist among public agencies that conceive VT in a different way.

This heterogeneity of logics appears not only in the statement of social stakeholders involved, but also in the actions developed by public policies. Particularly, government alliances led to the strengthening of the role of the trade union stakeholder. This stakeholder coexists among the different logics and participates in training networks that enable and expand their clientele and alliances, contributing to VT for young people and, more specifically, to the continuing training of workers. Even if VT still shows a persisting segmentation, the reconfiguration of roles and functions shows some examples of integrated actions that seem to have potential to articulate the logics for better social and individual development.

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27

The Evolution of Learning Regions: Lessons From Economic Geography for the Development of VET

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Introduction

Governments around the world see vocational education and training (VET) as an important part of their strategies to improve economic competitiveness by increasing and improving the supply of skills to businesses. As Unwin (2017) notes, current debates about the future development of VET are taking place in the context of concerns about the impact of globalization, climate change, demographic shifts, and new technologies, which raise difficult questions about changing skill requirements and how to meet them in the future.

This chapter draws on concepts and theories from economic geography—in particular, the notion of learning regions (LRs)—to argue that conventional policies for vocational education and skills in advanced economies need to be rethought. In particular, it examines the role of VET in relation to wider processes of economic development and innovation. Using the UK as a case study, it contrasts conventional VET policies, and the conceptualizations of learning that underpin them, with those associated with the various strands of the "learning regions" literature (Asheim, 2012). This literature, originating within the fields of economic geography and regional studies, has had a substantial impact on the development of regional economic development policymaking around the world and has inspired regional development initiatives across Europe (James, Vissers, Larsson, & Dahlström, 2016; Visser & Atzema, 2008). It focuses on the ways in which learning by individuals, firms, and institutions is linked together and supported in regionalized economic systems.

As discussed by James (2012) and James, Guile, and Unwin (2013), the LR literature is underpinned by quite different assumptions about the nature and role of learning compared to conventional discourses surrounding education and skills, in which learning is primarily conceived of as an activity undertaken by individuals following formal courses of further or higher education, resulting in

a qualification. As Keep, Mayhew, and Payne (2006) argue, this approach under-estimates the level of demand for skill within the economy and how effectively skills are "utilized in the workplace" (p. 456). In other words, education and skills policies should be considered in relation to what happens when qualified individuals enter the labor market, and how knowledge and skills are put to use in creating and producing new products and services.

The LR literature argues, first, that learning can be conceptualized at different scales, and that it can be understood as a collective process where the "learner" is a firm, institution, or even regional network. Although skilled labor is seen as crucial, the LR literature has little to say about learning by individuals in formal educational programs. Second, the ultimate outcome of learning is understood to be innovation in the form of new processes, products, and services. The "what" aspect of learning therefore includes technical and scientific knowledge and practical know-how. However, it also includes what Pinch, Henry, Jenkins, and Tallman (2003) describe as "architectural" knowledge (i.e., the "rules of the game"—the established routines and ways of doing business). Thus, learning processes are understood to be interactive and shaped by the regional economic context. Learning happens through interactions between individuals, organizations, and institutions. The LR literature has little to say about the overall qualification levels of the population, the structure of further and higher education courses, or assessment regimes. However, it does suggest new ways to better integrate VET with innovation and economic development policy and address structural issues related to the demand for particular skills. In this sense, the LR literature opens up new perspectives on fundamental questions such as the aims and objectives of skills policy, the stakeholders who should be involved in designing it, and how it should relate to other policy objectives.

A key feature of the LR literature is that it conceptualizes learning as highly path dependent. In other words, it envisages an evolutionary process whereby cumulative learning trajectories develop within regions over time as they become specialized in certain economic activities or types of technology. Institutional structures—which include VET—coevolve together with these industrial and technological specializations. In recent years, the LR literature has become increasingly concerned with the implications of evolutionary perspectives. In particular, there has been debate about the problems associated with "lock-in" to old or outdated activities and the institutional structures associated with them. Consequently, new theories of economic development have attempted to explain the possibilities for the development of new paths, either through the recombination of existing regional resources or by incorporating knowledge and skills from elsewhere into a regional economy. In the second part of this chapter, the implications of these theoretical developments for VET will be explored.

The chapter proceeds as follows. The "Learning Regions" section introduces the LR literature and provides a critical examination of the conceptualizations of learning that underpin it. The "Path Dependency, Relational Variety, and Regional Branching" section considers recent extensions to the LR literature, in particular, the implications of evolutionary theories. The "Using an LR Approach to Critique VET and Skills Policy in the United Kingdom" section applies the LR approach to critique vocational education and skills policy in the UK over the

past 15 years. This uses another concept, that of the *knowledge-based economy* (KBE), to discuss the main assumptions in UK policy about the nature of learning and the relationship between skills, economic development, and innovation. The chapter concludes with some recommendations for the development of VET and skills policies.

Learning Regions

The LR literature has a long history dating back to the work of Alfred Marshall (1890), who wrote about highly successful regional agglomerations of manufacturing industry in the north of England, which he termed "industrial districts." Marshall's ideas were rediscovered in the 1980s, as researchers noted the continuing propensity of firms in related industries to cluster together in economically successful regions. This second wave of research on industrial districts focused on regions such as Emilia-Romagna and Baden-Württemberg (Amin & Robins, 1990; Piore & Sabel, 1984) and identified several reasons for the growth of these regional clusters of activity: localized external economies (e.g., pools of skilled labor); lower transaction costs; the development of shared informal institutions and social capital; and the facilitation of complex divisions of labor between small, specialized firms that supported collaborative technological development and joint innovation.

During the 1990s, the literature on industrial districts and regional clusters became increasingly focused on learning and innovation, accepting the axiom that in post-Fordist economies, knowledge is the fundamental resource and learning is the most important process (Lundvall, 1992). Various terms have been coined to describe different parts of this literature, including "clusters" (Porter, 1998), "regional innovation systems" (Cooke, 1992), "territorial innovation models" (Moulaert & Sekia, 2003), and "learning regions" (Morgan, 1997). Although there are important differences between these different approaches (for useful overviews, see Lagendijk, 2006; Smed Olsen, 2012), they share a number of assumptions. In particular, they stress the importance of physical proximity between firms, which reduces transactions costs and facilitates collaboration and the development of common routines and institutions, which in turn supports collective learning and innovation. This is why the regional scale is considered to be so important and the concept of learning is central. For these reasons, I follow Asheim (2012) in adopting the term *LR* to refer collectively to these different contributions, while acknowledging the risk of glossing over differences in their approaches.

What, then, are the key features of the "learning" that forms the basis for these models of regional development? To begin with, we must acknowledge that there is no single perspective within the LR literature on what learning is and how it takes place. In fact, very few researchers in this field have seriously engaged with mainstream theories of learning (Oinas, 1999). Thus, the concept of learning is often mixed with other terms such as knowledge *spillovers, interactions, circulation,* or *flows.* Grønning and Fosstenløkken's (2015) review of the use of the concept of learning within the regional innovation system subfield of the LR

literature concluded that there is very little connection to existing theories of learning within educational science and organization theory literature. The material they reviewed tended to use "indigenous and vague definitions." Other commentators, such as Ellström (2010) and Uhlin (2000), have also noted the lack of conceptual clarity and explicit definition of learning in this field. Despite this conceptual fuzziness, it is nonetheless possible to identify some key themes and common arguments.

Perhaps the most important characteristic of the LR literature is that learning is primarily understood to take place through collective processes of innovation (James, 2012). Thus, learning is not solely—or even primarily—seen in terms of individuals acquiring new skills but as an inherently interactive process, associated with problem solving and the development of new products, processes, and services in the private sector (Malmberg & Power, 2005). This learning is understood to take place in teams that could involve collaborators from more than one organization and therefore highly depends on "inter-firm communication, socio-cultural structures and institutional environment" (Asheim & Isaksen, 2002, p. 83).

The second key feature relates to the importance of physical proximity for learning, which is said to explain the clustering of firms in regional economies. The LR literature has drawn heavily on the contentious distinction between tacit and codified knowledge in making claims about the importance of physical proximity (Duguid, 2005). Earlier contributions took the view that tacit knowledge was "sticky" and therefore difficult to transfer, requiring intensive, face-to-face interactions that also favored the clustering of related firms, although a more nuanced understanding of learning at distance has emerged more recently (Dahlström & James, 2012). Nonetheless, the regional scale is privileged, and a number of different "learning" mechanisms have been identified. Maskell and Malmberg (1999), for example, specify three "localised learning" processes based on interactions between firms: learning by monitoring rivals; learning by interacting with clients and suppliers; and learning through "buzz," which is a kind of spontaneous learning that takes place through face-to-face interactions within social or professional networks (see James et al. [2013] for a more extended discussion). In a later review, Malmberg and Power (2005) identify interorganizational collaboration, competition, and local rivalry, together with the mobility of individual workers, as localized processes that support learning and innovation.

These "learning processes" indicate a third key feature, which is ambiguity about the relationship between individual and collective learning. In the LR literature, workers, firms, and even regions themselves are conceptualized as "learners," and there is often little discussion of how these types of learning are related to one another (James et al., 2013). In their study of a motorsport cluster in the UK, for example, Henry and Pinch (2000) described the circulation of specialized technical knowledge through high staff turnover and new start-ups. In their account, firms "learn" unproblematically and automatically when a new engineer or designer joins the company. Similarly, it is claimed that firms "learn" through interactions with suppliers, but there is no analysis of how learning by individual employees in a collaborative development project is converted into

firm-level routines and systems. This conflation of learning by employees and learning by a firm is a common feature of the LR literature (James, 2012).

A fourth important characteristic of the LR literature is the tension between cognitivist ideas about learning—recognizable in the frequent representation of learning as "flows" and "transfers" of knowledge—and sociocultural theories of learning that draw on the concept of participation. The LR literature emphasizes the importance of the development of common institutions, economic cultures, routines, common understandings, and rules of the game that facilitate learning. Although competition and rivalry are said to stimulate learning between firms, there are also shared institutions and common resources, described as "institutional thickness" (Amin & Thrift, 1995) or "relational assets" (Storper, 1995). Formal institutions, including development agencies and educational organizations such as vocational colleges, universities, and other training providers, form part of this institutional landscape (Asheim & Coenen, 2005). Learning to navigate this formal and informal landscape requires participation in the regional economy and interaction with other actors (Tallman, Jenkins, Henry, & Pinch, 2004).

The LR literature has developed a perspective on learning that is distinct from that which characterizes conventional VET policy discourses and mainstream education or organizational learning theories. Despite the fact that learning is conceptualized in a vague and sometimes theoretically contradictory way, the broader approach of the LR literature provides some useful insights. The LR literature offers different answers to key pedagogical questions about who learns, what they learn, and how they learn (Grønning & Fosstenløkken, 2015). It emphasizes that learning is interactive, territorially embedded, and collective. In this way, it widens conventional perspectives on learning and skills from a focus on qualifications and underlines the fact that learning is an inherent part of producing new goods and services. Although the link between individual and collective learning is sometimes obscure, the LR literature suggests two main types of learning. First, individuals participate in work routines and become knowledgeable practitioners by working with other members of their occupational community to develop their knowledge and skills while creating goods and services. Second, collectives such as firms participate in activities to access new ideas from other contexts and/or generate new knowledge in order to innovate.

It is noticeable that there is very little attention paid to VET within the LR literature in relation to individual learning. Interaction between industry and institutions involved in research and development, such as universities and research centers, is seen as crucial, but the roles played by these and other institutions in relation to education and training are rarely mentioned. To a large extent, the presence of skilled and knowledgeable workers is simply assumed, and much greater emphasis is placed on what happens when workers actually enter the labor market. In this sense, "learning" in the LR literature begins where "learning" in conventional skills policy (focused on the supply of qualified labor) ends. The LR approach implies that although some kinds of knowledge and skills are learned through formal education, qualifications alone are not enough. Individuals also need to participate in a local labor market to learn the socioeconomic routines and rules of the game, which will shape the ways in which they

apply their theoretical knowledge and practical skills. The LR literature high-lights the importance of lengthy participation in working practices in a specific region, which is the primary means through which individuals learn the tacit knowledge and routines that give favored regions a competitive edge.

Developing this type of participation as part of VET would require not only the inclusion of employers in partnerships with local/regional government agencies and training providers but also specific policies to create opportunities for indi-viduals to engage in this type of learning. It may require the development of new firm-specific training partnerships with further and higher education institu-tions. Although the "classic" LR literature and its models of localized learning indicate some ways in which VET policy might be integrated with wider policies related to economic development and innovation, recent theoretical develop-ments within economic geography and regional studies have highlighted some limitations. In particular, there has been debate about the problems associated with lock-in to old or outdated activities and the institutional structures associ-ated with them. Consequently, new theories of economic development have attempted to explain the conditions that facilitate the development of new paths. In the next section, these ideas are discussed, with a focus on theories of regional economic development that stress the importance of combining different types of knowledge to create new economic trajectories.

Path Dependency, Relational Variety, and Regional Branching

The LR literature emphasizes that innovation and learning in regional econo-mies are "path dependent, locationally specific and institutionally shaped" (Mytelka & Smith, 2002, p. 1472; see also Chapter 8, this volume) as a result of specialization in particular economic activities. The implications are that par-ticular regions become specialized in certain sectors and that VET should be aligned with them, giving greater powers to firms and regional institutions to direct learning according to local business needs. The importance of regional institutions and routines is a key insight of the LR, but it also indicates poten-tial problems. For example, deference to firms' requirements when designing education and training may result in an overly utilitarian and narrow approach to VET (see Moulaert and Nussbaumer's [2005] critique). A second issue that has received increasing attention in recent years is regional lock-in, where the path-dependent processes that initially led to successful development eventu-ally lead to inflexibility and inability to adapt to new circumstances (such as technological developments). Østergaard and Park (2015), among others, high-light the problems that can affect even high-tech regional economies, where previously successful institutions and technological assets become outdated, leading to economic decline, high unemployment, and social problems. Learning through participation in local routines and institutions is unlikely to be useful if they are linked to uncompetitive industries, obsolete technology, or failing economic models.

Lock-in may occur in several areas relevant to VET, as MacKinnon (2008) explains:

> The functional dimension implies a lock-in to particular methods of production, forms of working or ties to specific suppliers or customers, while cognitive lock-in implies a failure to develop appropriate collective learning mechanisms that allow firms not only to experiment and innovate, but also to be able to read the signs of external change and act appropriately. Political lock-in reflects the failure of regional political actors to change policy mechanisms to encourage innovation and learning and the domination of a particular set of habits and modes of thought over policy-making. (p. 1456)

Maskell and Malmberg (2007) also recognized the problems of lock-in in their discussion of the incremental nature of many innovation processes. Firms develop "myopic" search routines that "allow actors to economize on fact-finding and information processes.… They tend to look for solutions close to already existing routines, but they also tend to concentrate their search in their spatial vicinity" (pp. 613–614). Grabher (1993) described this as a situation where the links developed in strongly embedded regional networks turn "from ties that bind to ties that blind" (p. 24).

The potential for damaging lock-in, where learning myopia and inflexible institutions and routines limit the capacity for economic renewal, is an important limitation of the LR literature and its assumptions about the link between learning and economic success. There have been two main responses to this. First, there is a recognition that learning and innovation are not necessarily regional processes (Dahlström & James, 2012; James et al., 2016; Moodysson, 2008). Rather, firms learn through "combinations of networks operating at different spatial scales from the local to the international are a key feature of innovation. The most innovative city-regions are highly networked across all these scales" (Simmie, 2005, p. 795). As a result, new models of "knowledge dynamics" have been developed to explain learning that takes place during interactions between actors who are not permanently co-located, for example the idea of local buzz combined with global pipelines that link together regional and global learning processes, or temporary "clusters" (Bathelt & Schuldt, 2008; Bathelt, Malmberg, & Maskell, 2004), such as trade fairs and conventions. Other models, such as territorial knowledge dynamics (Crevoisier & Jeannerat, 2009) and knowledge anchoring (Dahlström & James, 2012; Jeannerat & Crevoisier, 2011), suggest that learning takes place through strategic links with partners in other regions or countries. These contributions emphasize the importance of developing absorptive capacity, a concept originally introduced by Cohen and Levinthal (1990) as the ability of a firm to "recognize the value of new, external information, assimilate it, and apply it to commercial ends" (p. 128). Although earlier contributions to the LR literature implied that individuals learn primarily through participation in a slowly evolving set of regional institutions and routines, these newer contributions suggest that workers are likely to be

spatially mobile and interact in networks that stretch beyond the region and potentially across the world. The demands of global learning processes will require the development of a different set of skills through VET. Firms will need employees who can identify sources of knowledge, interact with people from very different "communities," and leverage different networks connections in order to learn.

A second strand of research has focused on the conditions and processes that might lead to the development of new regional development paths. This research has been heavily influenced by evolutionary concepts, such as variety, selection, path dependency, resilience, branching, and punctuated equilibrium (Martin & Sunley, 2014). One of the most prominent debates here is whether regions might avoid lock-in to a declining trajectory through regional path branching—where new economic activities can be developed to replace those that have been rendered uncompetitive and/or obsolete, thus creating a new growth trajectory. In this context, the idea that combining old and new activities, skills, and knowledge leads to innovation has gained traction. Thus, as Martin and Sunley (2006) note,

> [S]everal accounts argue that the art of avoiding 'lock-ins' lies in the recombination and reworking of socio-economic-technological residuals and legacies from preceding rounds and phases of economic growth. In addition, agents may learn from practices and solutions used in adjacent fields or in subordinate activities. (p. 421)

This interest in combinatorial rather than cumulative learning and innovation also reflects changing assumptions about innovation processes, which are now acknowledged to be "increasingly complex, diverse and interdependent … here is a larger variety of knowledge sources and inputs to be used by organizations and firms, and there is more collaboration and division of labor among actors" (Asheim, Boschma, & Cooke, 2011, p. 896). Cooke (2012), for example, identifies a new dimensioning of industrial knowledge flows in regional economies, from vertical, cumulative, and sectorally specialized "silos" to horizontal and combinatorial "platforms" (see also Harmaakorpi, 2006).

Previously, externalities based on specialization were assumed to be most important for supporting learning. Increasingly, however, the importance of externalities based on diversity is emphasized, referring to the existence of a diverse range of economic activities in a region that "improves the opportunities to interact, modify, and recombine ideas, practices and technologies across industries … variety in itself may be an extra source of knowledge spillovers and innovation" (Frenken, Van Oort, & Verburg, 2007, p. 687). However, it is recognized that extreme diversity may not be conducive to the development of "combinatorial" innovations and new regional "paths." If industries are too different, then communication and collaboration between the relevant firms and institutions may be impossible. A key concept here is the notion of *related variety*, which refers to a situation where there is enough difference for novelty but not so much that potential collaborators cannot understand or learn from each other. This implies that regions are more likely to diversify into sectors

related to existing activities and that the ability to identify potentially relevant sources of combinatorial innovation and communicate across sectoral boundaries is a crucial skill if damaging lock-in is to be avoided in the longer term.

This has important implications for the development of VET because, in many countries, VET policies continue to be developed on the assumption that there are distinct sectors with specialized skillsets, which share generic skills such as numeracy and literacy. A recent example in the UK is the Industrial Partnerships initiative, which aimed to bring together employers in particular sectors to develop skills. Eight partnerships were set up, each chaired by a key employer in the aerospace, automotive, creative, nuclear, tech, energy and efficiency, science, and tunneling and construction industries. Similarly, the development of national colleges, intended to be expert training centers focused on key areas of the economy, has also followed sectoral divisions. Recent debates about related variety suggest, first, that focusing on horizontal "platforms" of related activities or technologies is increasingly important; and, second, that related variety in specific regional resources should be identified and encouraged, rather than a single national strategy focused on "picking winners."

Using an LR Approach to Critique VET and Skills Policy in the United Kingdom

Just as in many other countries, successive governments in the UK have assumed that increasing the qualification levels of the population would improve productivity, increase innovation, raise wages, and enable the country to compete successfully in the global economy (see, inter alia, Keep, 2010; Lupton, Unwin, & Thomson, 2015; also Chapter 6, this volume). The aim here is not to give a comprehensive account of the many reforms that VET has been subject to in the UK, nor to evaluate the impact of specific initiatives. Rather, the objective is to set out the ways in which learning is conceptualized in conventional VET and skills policy and how that learning is linked to innovation and economic development.

The purpose of VET and broader skills policy in the UK is both social and economic. Increasing skills levels are routinely linked to higher levels of social mobility, reduced poverty, lower unemployment, and greater social inclusion (Fuller, Rizvi, & Unwin, 2013; Unwin, 2010). However, these social benefits are generally understood to be the result of economic growth. In this sense, political and policy discourses about VET have remained remarkably consistent in prioritizing qualification levels and the UK's position in international skills league tables, in what has been described as the "global skills race" (Brown, Lauder, & Ashton, 2011). Gambin and Hogarth (2016), writing in the introduction to an evidence review produced for the current UK government, declare that the primary purpose of skills policy "is to boost productivity, however defined, upon which the UK's prosperity ultimately depends" (p. 5).

Since the late 1990s, the economic competitiveness of the UK has been framed in terms of the challenges of economic globalization and the loss of manufacturing jobs to lower cost countries. In response to these challenges, education and

skills policy was directed toward the development of a so-called *knowledge-based economy* (KBE) in which economic growth is derived from the production of high value-added goods and services by highly skilled workers (Department for Business, Innovation and Skills [DBIS], 2009; Department of Trade and Industry [DTI], 1998). The KBE concept has its origins in the work of Daniel Bell (1973), who introduced the idea of a postindustrial society based on scientific knowledge. However, what actually constitutes a KBE is ill-defined. Frequently cited characteristics include economic growth based on investment in science, technology, engineering, and mathematics (STEM); the development of information and communication technologies (ICT); economic globalization; increasing numbers of well-educated workers and customers; and the development of entirely new high-tech sectors and industries (James, 2012). Brinkley (2008) suggests that knowledge industries (i.e., high-tech manufacturing or knowledge-intensive services), knowledge workers (i.e., those with degrees or in the top three occupational codes), knowledge assets (e.g., investment in R&D), and knowledge services (i.e., value/volume of trade in knowledge industries) are specific indicators that could be used to measure the size of a KBE. A broader definition includes information processing and knowledge creation across all economic activities, not just those defined as high-tech or knowledge-intensive.

These definitional debates are important because they have framed the development of both VET and skills policy. In a 1998 government white paper published by the then Department of Trade and Industry (DTI, 1998), the KBE was described as "a general phenomenon, encompassing the exploitation and use of knowledge in all production and service activities, not just those sometimes classified as high-tech or knowledge intensive" (p. 2). This relatively broad conceptualization of a KBE was reflected, for example, in the reform and expansion of apprenticeship programs into occupations such as retail and the creative industries. However, by the late 2000s, a narrower definition focused on science and technology became more dominant. In 2009, another white paper, *Skills for Growth,* stressed the importance of increasing the number of students studying subjects such as life sciences, digital media, advanced manufacturing, engineering construction, and low-carbon energy (DBIS, 2009, p. 10).

Throughout this period, however, it is clear that increasing "knowledge" in the economy was understood primarily in terms of increasing the proportion of the workforce with qualifications. Thus, individuals were encouraged to credentialize a wider range of lower level skills through competence-based assessment in the workplace in order to gain a National Vocational Qualification (NVQ). At the same time, targets were set to increase the proportion of young people gaining other formal qualifications at colleges and universities. Following the government-commissioned Leitch Review of Skills (2006), intermediate skills were also targeted, with the aim of creating a "technician class." Since 2010, the Coalition and Conservative governments have continued reforms to the funding and governance of VET. These highly centralized reforms have been implemented in the context of substantial cuts to the public funding of VET and an assumption that firms would be willing to invest more in training themselves, as long as the provision was of high quality (DBIS, 2010). However, the belief in the link between increasing the supply of skills to the labor market and improved

economic outcomes continues to underpin the development of VET policy in the UK (Gambin & Hogarth, 2016).

Many commentators have criticized the focus on credentialism, arguing that qualification levels are less important than how knowledge and skills are used in the workplace (Felstead, Fuller, Jewson, & Unwin, 2009; Keep & Mayhew, 2009). Thus, as Brown, Lauder, and Ashton (2008) argued, "it is how the capabilities of the workforce are combined in innovative and productive ways that holds the key [to economic competitiveness]" (p. 141). James, Guile, and Unwin (2011); James et al. (2013); and James (2012) have argued that conventional VET and skills policy in the UK makes a number of assumptions about learning, which reflect what Sfard (1998, p. 5) described as the "acquisition metaphor" of learning. Thus, learning is seen as something undertaken by individuals, either through formal courses at institutes of further and higher education or in the workplace. It is understood as a process of assimilation where measurable content with clearly defined occupational or disciplinary boundaries is transferred to individual learners. This means that learning is not conceptualized as part of everyday working practices through which goods and services are produced. Rather, it is seen as a separate activity that results in inputs of knowledge to the economy. These inputs, which can be measured in terms of formal qualifications, are assumed to be easily transferable such that what is learned in an educational context can be applied in business settings.

However, the results of 20 years of government policy based on a supply-side skills strategy have been somewhat underwhelming. The OECD's (2013) international adult skills showed that overall skills levels in the UK are below average on many measures (e.g., literacy and demands for workers educated beyond compulsory education). At the same time, overqualification and underutilization of skills are more prevalent than in many other developed economies (Green, Felstead, Gallie, Inanc, & Jewson, 2013), indicating that there is a lack of demand for skills within the labor market—the so-called *low skills equilibrium* (Finegold & Soskice, 1988). In addition, there appears to have been a reduction in the amount of training that workers are undertaking in recent years (Green et al., 2013). The relatively poor performance of the UK economy in terms of productivity growth has become a major topic of political and academic debate (Emmerson & Pope, 2017). Unsurprisingly, given these poor outcomes, the supply-side strategy and its underlying assumptions about learning have been the subject of a sustained critique (Heath, Sullivan, Bollver, & Simdars, 2013; Lupton et al., 2015).

The centralized nature of UK policymaking for VET and skills more broadly has also been subject to criticism. Lupton et al. (2015) note that "increasing central control over qualification design, curricula and pedagogy … marginalized other stakeholders" (p. 10). At the same time, continual reform of governance structures and funding arrangements has created a confusing and complex system, which is difficult for individuals and businesses to understand. One example is the bewildering number of different institutions that have been used to shape skills policies and manage funding streams. The establishment of devolved government for Scotland, Wales, and Northern Ireland in the late 1990s has produced some divergence from England with regard to social policy,

but it wasn't until 2004 that the then Labour Government brought forward the idea of establishing regional assemblies in England. Although this didn't happen, the idea of devolution for England was revived by the Coalition Government in 2010, with plans to develop a "Northern Powerhouse." Parr (2017) explains that the primary aim:

> was a spatial rebalancing of the UK economy by encouraging development in the North of England so as to create a counterweight to London. This was intended to lessen the North–South divide which had shown few signs of disappearing, and which was held to be inimical to the performance of the UK economy. (p. 491; see also Keep, 2016; Lee, 2017)

The devolving of (a much reduced) adult skills training budget was included in the initial plans. It is too early to comment on whether English devolution will provide the basis for the creation of LRs, and the current preoccupation with the UK's impending departure from the European Union may divert attention away from regional priorities. However, England does seem to at least have created an opportunity for new thinking at regional and local levels about how VET and skills policy might be reconfigured.

Conclusions

Policymakers in advanced economies face a number of challenges in relation to the development of VET policies that support economic growth and social objectives. These include globalization, demographic changes, and new technologies, which are changing the demand for different types of skill. In this context, current VET policy has faced criticism for its supply-side focus on increasing the qualification levels of the workforce through formal education and training. Building on the arguments of those who have advocated the integration of skills, innovation, and economic development policy, this chapter has explored the implications of the LR literature. It has set out the ways in which this body of research, which is concerned primarily with regional-scale innovation systems, conceptualizes learning and its links to economic development.

The LR literature conceptualizes learning as an inherent part of collective innovation processes where the presence of skilled workers is assumed and learning is directed toward the development of new products and services. Although technical knowledge is important, the LR literature operates with a broad understanding of what is learned, including regional routines and informal institutions. Thus, it focuses almost exclusively on the learning that takes place in the workplace and through interactions between organizations, and very little on formal VET institutions and training programs. One of the potential contributions of the LR literature to debates about the role of VET is that it offers new perspectives on how to link together policy issues, which are often separated into business/innovation support (for collective learning as innovation) and education/skills (for individualized learning as qualifications).

It also emphasizes the importance of local and regional contexts in shaping skill demands and learning processes, and recognizes the fact that learning and economic development are highly path dependent. Thus, regions follow a path-dependent trajectory as they become specialized in certain economic activities or types of technology. Institutional structures—which include VET—co-evolve together with these industrial and technological systems.

Recognition of the importance of path dependence has led to debates regarding the limitations of the LR literature, which implies that VET should be closely linked to a regional economy. This risks the development of narrow education and training programs that are based on the needs of specific firms that are inward looking, and that neglect the wider social goals of education. Over time, there is a risk that VET institutions become "locked in" to old or outdated activities. In response to concerns about lock-in, the LR literature has been further developed to include evolutionary theories that provide insights into the mechanisms through which new regional trajectories might be developed. This might take place through the recombination of existing regional resources or by incorporating knowledge and skills from elsewhere into a regional economy.

These theoretical developments have a number of implications for the development of VET in advanced economies. Although the classic LR literature implied that individuals learn through participation in a stable set of regional institutions and organizations, the newer contributions emphasize the importance of extraregional interactions and the development of absorptive capacity. Thus, VET will need to prepare workers to participate in networks with people from different countries and be able to identify new sources of knowledge around the world. A second strand of research dealing with the combination of existing regional knowledge bases and resources implies that current strict disciplinary and sectoral boundaries in the provision of VET are not ideal. Instead, individuals will need support to develop multidisciplinary knowledge and the skills to manage projects that span geographical, sectoral, and organizational boundaries.

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Page references to Tables are followed by the letter 't'. 'VET' stands for 'vocational education and training'.

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