



RUTGERS EDUCATION AND EMPLOYMENT RESEARCH CENTER

**LESSONS FROM EUROPEAN STATES:
POLICY AND PRACTICE IN CAREER AND TECHNICAL EDUCATION**

HEATHER MCKAY
JUSTIN VINTON
JAMES BOYLE
MICHELLE VAN NOY

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RUTGERS
School of Management
and Labor Relations
**EDUCATION AND EMPLOYMENT
RESEARCH CENTER**

Janice H. Levin Building
94 Rockefeller Road
Piscataway, New Jersey 08854
smlr.rutgers.edu/eerc

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EXECUTIVE SUMMARY	1
INTRODUCTION	2
METHODS	3
EU VET IN CONTEXT	3
Institutional Differences Across the EU and US Systems	4
Changes in EU VET Since the Great Recession.....	5
EU VET and Future of Work Challenges.....	9
Lessons from EU VET for the United States.....	11
Educational and Career pathways.....	11
Post-Secondary/Tertiary VET.....	16
Adult Education & Retraining	17
Special Programs.....	19
Qualifications.....	19
Skills.....	21
Recognition of Prior Learning.....	23
VET Curriculum, Policy, and Updates	24
Delivery	25
VET Teaching, Teacher Training, and Professional Development	27
VET Funding.....	28
Industry Upskilling/Retraining Examples.....	29
Manufacturing (Germany, Denmark).....	29
Information and Communication Technology (Spain).....	31
Biotechnology (France).....	31
Conclusion	31
Appendices	43
Appendix A – Germany Country Brief.....	43
Appendix B – France Country Brief	57
Appendix C – Austria Country Brief	68
Appendix D – Finland Country Brief.....	80
Appendix E – Spain Country Brief.....	91
Appendix F – Denmark Country Brief.....	100

EXECUTIVE SUMMARY

The changing nature of work raises many questions for the US education system about how to prepare skilled technicians. As work changes and the pace of innovation accelerates, technicians will need to acquire new skills. Conversation abounds about the future of work, the potential for widescale change in work processes, and even the kinds of jobs people will do in the wake of advances in automation and technology (Autor et al., 2019; OECD, 2019b). The shifts to remote learning and work caused by the pandemic have further complicated this reality.

These changes will require career and technical education (CTE) systems in the United States to adapt their approaches to technician education in a myriad of ways. It will be important for workers to be able to acquire new skills throughout their life course, for education to keep up to date with changes in industry, and for workers to have the opportunity to retrain as jobs shift and disappear. Because this phenomenon is global, there is value in looking at how other countries are responding to these realities. The EU, with its highly developed economies and various approaches to what they refer to as vocational education and training (VET), offers potential lessons for the US CTE system. This paper broadly discusses VET policies across six countries in Europe—Austria, Denmark, Finland, France, Germany, and Spain—along with the lessons they offer the US CTE system and potential policy and practice implications. Appendices A through F provide short briefs on each of these systems.

The discussion is focused on many of the policy and practice changes that were put in place in European VET systems following the Great Recession. As a response to this economic crisis and the growing interest in VET in many countries, an effort was made to alter the character and structure of European VET systems to promote adaptation to change. This resulted in a variety of shifts and changes to VET policy and delivery structures designed to provide more opportunities for lifelong learning, reskilling, and upskilling. These changes were intended to create new avenues through which the workforce could adapt to changing industry needs, and workers would have new career and educational pathway options. Across the countries we studied, these adaptations included:

- implementation of multiple entry and exit points;
- creation of educational pathways between VET and more traditional academic study;
- recognition of non-institutional learning; granting local authorities the ability to adapt and shape curriculum to local industry needs; modularization of curriculum;
- development of structures for work-based learning; training and professional development in industry for VET teachers; and financing VET for workers (youth and adults) and employers.

In many cases the approaches we highlight are practices that are already happening in the United States but may not be done to scale or may be approached differently. Some of these differences are of course partly due to context and the structures of the systems in Europe versus the United States. However, there are policy and practice tools that could be transferred to American CTE in a more formal way. As such, we think that a close examination of how these practices have been executed in various European contexts is both useful and timely as the U.S. begins to rethink federal and state CTE policies as well as CTE systems and institutional activities more broadly.

INTRODUCTION

The changing nature of work raises many questions for the US education system about how to prepare skilled technicians. As work changes and the pace of innovation accelerates, technicians will need to acquire new skills. Conversation abounds about the future of work, the potential for widescale change in work processes, and even the kinds of jobs people will do in the wake of advances in automation and technology (Manyika et al., 2017; Autor et al., 2019; OECD, 2019b). The shifts to remote learning and work caused by the pandemic have further complicated this reality. Predictions of the breadth and depth of this change vary, with some scholars stating that between 10 to 50 percent of jobs will disappear or change drastically in the near term (Arntz et al., 2016; Frey & Osborne, 2017). However, while automation may change what work we do and how we do it, it also has the potential to create new opportunities for some workers (Bessen, 2020).

Technicians play an increasingly important role in the changing economy. A recent report on the skilled technical workforce highlights the importance of technicians and technician education to the American economy as new technologies and automation change the pace of production and productivity (National Science Board, 2019). Technicians mediate technology and practice in their work, an often-unseen process (Barley & Orr, 1997). As trained mid-level workers, technicians interact with technology in both high-end research and development (R&D) and practical execution (Barley, 1996). This can lead to novel innovations as well as to advances in productivity at firms and across entire regions (Helper et al., 2018).

In the United States, community college technician education programs prepare the nation's skilled technical workforce across many fields. These include information technology; manufacturing; agricultural and environmental, bio- and chemical engineering; and nanotechnology. They may result in associate degrees, short- or long-term credit-bearing certificates, or industry certifications, such as those offered by CompTIA in information technology or by the National Institute of Metalworking Skills (NIMS) in manufacturing. These programs are expected to be up to date on industry needs and to act as a conduit to local industry. Given the changing and innovative nature of their associated industries, however, technician education programs find themselves at the center of the rapid changes in technology. Community colleges prepare technicians and thus are central to this conversation.

Adjusting to these changes will require our career and technical education (CTE) systems to adapt in a myriad of ways. It will be important for workers to be able to acquire new skills throughout their life course, for education to keep up to date with changes in industry, and for workers to have the opportunity to retrain as jobs shift and disappear. Because this phenomenon is global, there is value in looking at how other countries in the world are responding to these realities. The EU, with its highly developed economies and various approaches to what they refer to as vocational education and training (VET), offers potential lessons for the US CTE system.

Our goal here is to discuss VET policies across six countries in Europe—Austria, Denmark, Finland, France, Germany, and Spain¹—along with the lessons they offer the US CTE system and potential policy and practice implications. See the Appendices for detailed accounts of each country’s VET system and structure. The EU systems we present offer illuminating examples of both broad VET standardization and quality as well as employer- and system-driven transferability and flexibility innovations within VET systems that can translate to similar innovations in US CTE. In some cases, the features we highlight are practices that are already happening in the United States but may not be done to scale or may be approached differently. Some of these differences are of course partly due to context and the structures of the systems in Europe versus the United States. We believe, however, that a close examination of how these practices have been executed in various European contexts is both useful and timely as the U.S. begins to rethink federal and state CTE policies as well as CTE systems and institutional activities more broadly.

METHODS

This report involved two primary activities. First, we conducted a literature review. We searched academic databases and conducted internet searches on numerous terms in varying combinations to find relevant articles and resources for each country in our study, including but not limited to: Vocational Education and Training (VET), Career and Technical Education (CTE), Vocational Advanced Technological Education (ATE), technical education, technicians, vocational education, workforce education, occupational education, career pathways, artificial intelligence (AI), skilled technical workforce, STEM programs, middle skills, and stackable credentials. We also searched within the OECD website and those of related organizations as well as government webpages dedicated to VET. To keep track of the useful articles and other resources we found, we kept an account of search terms used, source title, URL, date of the source’s publication, and the date accessed. We also downloaded a PDF file of the document if one was available and wrote a short summary. These source characteristics were able to be filtered by country. We used the citation software Zotero to keep track of citations.

The second step was to conduct interviews with one or more experts on VET from each country to fill in some descriptive questions or gaps that may have been missing from the literature, and to get a better understanding of the actual implementation of VET in each country. To do this, we made contacts through various colleagues, including the supporters of this grant. We also reached out to authors of the relevant articles we found through email. We then set up hour-long virtual interviews through Zoom using a semi-structured interview guide. In total, we spoke to 11 experts and academics.

EU VET IN CONTEXT

This research identifies some of the main EU VET models and methods that have applicability in the United States. Looking to other contexts for lessons on skills development has precedent.

¹ The VET systems in each of these countries are described in detail in appendices to this report.

(e.g., Ibsen & Thelen, 2020; Autor et al., 2019; Busemeyer & Trampusch, 2012). In the sections below, we provide background on how the U.S. can use lessons from the EU. This includes a discussion of the basic institutional structures in the EU relative to those in the U.S. to provide context on the parameters in which the systems operate. We then provide more background and context on current developments in the EU, including changes in the VET system since the Great Recession, as well as current challenges to the EU VET system associated with the future of work.

Institutional Differences Across the EU and US Systems

Fundamentally, the US and EU countries have different institutional structures that are important to understand when examining VET practices. These institutional structures can help provide insight on how policies and practices can be imported across contexts. At a high level, the U.S. and the EU differ in the development and implementation of VET curriculum and in the degree of coordination among institutions. EU VET systems are more centralized as a result of the region's coordinated market economy compared; in contrast, the less coordinated and structured approach of the U.S. CTE system reflects its liberal market economy (Hall and Soskice, 2001).

Skills formation systems or VET can further vary across these country contexts based on the involvement of firms in VET. Countries' VET training can fall under a few types of systems (Busemeyer and Trampusch, 2012):

- Statist: Programming is driven primarily by the state, yet also with firm and union involvement.
- Segmentalist: Firm investment in training exists, but general education is primarily obtained through markets.
- Liberal: Skill formation emphasizing general skills is obtained through markets, with firms or community college providing firm-specific skills but with varying quality.
- Collectivist: Firms and intermediary associations such as employers' associations, union associations, chambers of industry, and tripartite committees are heavily involved in programming decisions.

The U.S. falls under the liberal system, while the EU countries in this study are either statist or collectivist systems. (Table 2 later in the paper discusses each countries' categorization and the involvement of stakeholders in curriculum development.) These categories provide a structure from which to think about flexibility and adaptation and offer a tool to compare the models described in the six country appendices below with the US CTE system.

Of note, there are some clear benefits that can be gained in terms of both quality and transferability for VET in statist and collectivist systems that are not possible in a liberal system. The greater degree of coordination in these systems allow for more systematic and widespread changes that can pave the way for adaptation at a wider scale than with a liberal system. This is

an important consideration as one thinks about the realities of the fast-paced changes that are increasingly needed to respond to a world with everchanging technology, and an important difference when considering importing reforms across contexts.

Other important differences in the EU and US contexts have to do with the balance of power between workers and employers. Countries with strong social dialogue and VET systems can maintain more equitable skill distributions in their respective labor markets. This is primarily because of governance structures in VET that give a relatively equal voice to the state, training partners, employers, and workers. In contrast, the strong power of employers in US labor markets underscores that it is not just the absence of social partnerships or accessible vocational training that drives wage and skill inequality in the U.S., but rather how the nature of the social partnership itself often leaves workers without a meaningful voice or control over the systems and programs that are designed to enhance their skills.

While US unionization rates have been declining over time, the average collective bargaining coverage of the six countries in this report is over 83 percent of the workforce (OECD, 2021b); in France and Austria in particular, that number is 98 percent of their respective workforces. These conditions allow workers to meet employers on a more equal playing field when designing and implementing VET systems, anticipating skill needs for both employers and workers, and determining who reaps the benefits of VET. Of note, collective bargaining coverage is on a downturn throughout the EU (OECD, 2021b)). However, in the U.S., the situation is more dire, with only about 12 percent of the workforce holding collective bargaining coverage (OECD, 2021b). This significantly limits workers' ability to advocate their needs when negotiating training programs at the firm, industry, and sectoral levels (and beyond). Research demonstrates that US employers' labor market power has increased dramatically relative to faltering collective bargaining power for workers, allowing companies to increase their skill demands for incumbent workers and/or look for workers with higher skill levels without paying higher wages (Modestino et al., 2015; Naidu & Sojourner, 2020).

Changes in EU VET Since the Great Recession

The 2008 Great Recession marked a change in EU VET systems. This period sparked a mass wave of youth unemployment across the EU, reaching upwards of 20 percent across member states in 2009 (Heyes, 2013). Some countries, such as Spain, also experienced significant increases in unemployment among older workers (Heyes, 2013). Countries that fared the best typically had strong VET systems with additional employment protections. In response to the crisis, the European Commission elevated "flexicurity" as the dominant employment policy prescription to address rapidly increasing unemployment levels (Heyes, 2020). It is important to define exactly what this means in the context of VET. According to the European Commission, flexicurity is an "integrated strategy to enhance, at the same time, flexibility and security in the

labour market” (European Commission, 2007). Under this agenda, VET combines with active labor market programs (ALMPs) to ensure that workers maintain employability through crisis periods. In this way, the employment crisis caused by the recession encouraged many countries in this study to rapidly increase spending on training. In the case of Denmark, Germany, France, and Austria, this increase in spending marked a distinct policy reversal, occurring after relatively sustained periods of reduced state spending on training measures going back to at least the late 1990s.

However, despite the short-term increase in state spending, most countries struggled in terms of maintaining work-based learning opportunities due to the worsening economic conditions in many companies. Research shows that firms become less inclined to take on apprentices and trainees during economic downturns, and the 2008 crisis was no different (Brunello, 2009). Germany in particular felt the impact of this reality its dual system, despite its historically high employer cooperation and support. While the system initially remained healthy during the crisis (and was elevated as a model for other European countries where VET systems quickly went into freefall), the number of apprenticeship contracts began to fall as early as 2009. State subsidies increased to encourage companies to take on apprentices, particularly students who had been displaced as a result of the economic crisis. However, subsequent negotiations between the state and employers revealed a tangible decrease in the propensity for German companies to offer apprenticeship opportunities. As a result, concessions were made in terms of the total number of apprenticeship contracts to be annually made available, and contracts were amended to reflect reductions in training duration, working hours, and employment protections for apprentices. This infuriated many German trade unions and caused most to leave the negotiations over the national-level apprenticeship pact (*Ausbildungspakt*). Other countries experienced similar reductions in employer interest in apprenticeships (Heyes, 2020).

Despite issues with apprenticeship availability, Germany’s use of short-time work in combination with expanded training opportunities for workers on short-time was regarded as a smart strategy for weathering the Great Recession. Short-time allows workers to retain their

U.S. VET Changes After the Great Recession

Perhaps the most consequential response to the Great Recession in the U.S. vocational education system at the national-level was the implementation of the Department of Labor’s Trade Adjustment Assistance Community College and Career Training (TAACCCT) grant program, which provided over \$2 billion in funding to higher education institutions between 2011-2014. In some ways, TAAACCT grants helped to encourage VET institutions (primarily community colleges) to become more innovative, accessible, and form stronger partnerships with employers (Milkeson, et al., 2017). They also provided an opportunity for community colleges to acquire new technologies and improve curricula to respond to local needs and the changing needs of different industry areas. out-of-pocket costs to access VET, which remains a substantial difference between the U.S. and EU VET systems (Snyder & Dillow, 2011). However, these changes to policy and practices were not necessarily institutionalized and, in many places, the good work that occurred during the grant period faded as the funding sunsetted.

jobs at a reduced number of hours while upskilling; at the same time, it allows employers to retain their skill base in their workforce, placing them in an advantageous position when the economy begins to move into recovery (Heyes, 2013). Though short-time work was lauded as a successful model during the Great Recession, most apprentices were not put on short-time work during the COVID-19 crisis (CEDEFOP, 2020).

While Germany mostly worked to preserve its more holistic and fairly rigid dual system by offering workers on short-time work expanded training during the Great Recession period, other countries worked to more fundamentally alter the character and structure of their VET systems to promote more flexibility during the crisis. One such strategy was to combine a reduction in the number of qualifications with a broadening of training content. This led to the incorporation of more transversal skills in VET programs that allow learners to cover a wider range of skills and competences. In addition, rapid technological changes in the wake of the Great Recession have encouraged many countries to reorient VET curricula around delivering digital transversal skills needed for more high-tech occupations and work environments. Denmark is an example of a country that has taken this route by simplifying VET curricula to cover four main occupational categories and by expanding the range of skills covered in VET courses (CEDEFOP, 2018a). Notably, the country saw an increase in participation in continuing training following the start of the recession (Heyes, 2013).

In the period following the crisis, some countries have found that decentralization of governance over VET has helped encourage more flexibility in programming to respond more directly to local needs. For example, French reforms in 2014 gave regions more control over the management of training policies, implementation of VET, and support for small- and medium-sized enterprises. The creation of regional public training and guidance services were also part of these reforms. Overall, decentralization has encouraged decision-making and management authorities to align VET systems more closely with local labor market realities (CEDEFOP, 2018a).

These kinds of reforms generally incur more autonomy at the level of training delivery and allow the system to more quickly respond to labor market and economic changes. Moreover, new curricula can be adopted fairly rapidly under this structure. CEDEFOP (2018a) examines the advantages of this approach compared with systems aimed at providing a broad foundation that can be adapted to meet more specific needs. Their research shows that new courses implemented rapidly run the risk of delivering skills that become obsolete just as quickly, while broad courses, although still flexible, often are difficult to reform if the labor market undergoes significant and rapid changes. In other words, more localized structures for VET administration need to strike a balance between delivering more specific training programs that can respond to immediate local needs while also continuing to provide broad-based transferable skills that workers will need in the labor market in the long-term (CEDEFOP, 2018a).

Another strategy some EU countries have implemented to encourage VET flexibility post-2008 is increasing the number of educational pathways to higher education available to VET students

as well as the number of linkages between VET and general education systems. This occurs in a variety of ways. National qualifications frameworks can allow learners to acquire qualifications through multiple pathways, including through training delivered outside of formal systems. Finland, for example, created pathways that allow learners to progress from upper secondary VET to higher education. France, on the other hand, focused on establishing distinct VET tracks within higher education (CEDEFOP, 2018a).

On a more granular level, some countries have allowed greater flexibility in terms of what is actually being delivered within a specific training course or program, encouraging more individualization of learning outcomes designed to meet the needs of both learners and employers. This is the case in Finland, which has established a strong basis for more individualized training pathways. France offers all workers the right to a skills assessment every two years as well as a personal training account that can be used for programs of their own choice instead of what their employer proscribes them (CEDEFOP, 2018a). While flexibility reforms have had fairly positive impacts on the VET systems in which they have been implemented, flexibility as an inherent good in the context of VET also may be challenged by how it operates in the broader labor market. In more regulated (less flexible) labor markets, there is typically more certainty on investments in VET, in terms of both the destination of particular training pathways as well as the return on investment for employers who provide training (Acemoglu & Pischke, 1999). In more flexible labor markets, there is less assurance about where a certain training program may lead, as well as greater risk for employers making investments in training (Gambin & Hogarth, 2016). In addition, many VET flexibility agendas have been implemented in combination with relaxed restrictions for training companies to pay into social security and other employment protections for their apprentices and trainees (Heyes, 2020). While these tradeoffs may encourage more apprenticeship contracts by helping training companies reduce costs, they may in turn hurt apprentices' economic security in the long run (Heyes, 2020).

Another important post-2008 development is the persistent issue of youth unemployment that remained high in most EU member states even after the implementation of more flexible VET opportunities. Even unemployment among young people with a tertiary VET education (typically a higher level than what most VET graduates hold) reached upwards of 18 percent by 2011. These trends help illustrate that while flexible VET options are certainly lifelines in periods of economic crisis, they may not address the root causes of employment crises. Heyes (2013) argues that "areas of skills shortage notwithstanding, Europe's current problem is not a lack of skills but a lack of jobs and a lack of policies to create jobs. Austerity measures and a new fiscal pact in the Eurozone are placing additional constraints on government spending and are likely to further encourage policy-makers at [the] national level to pursue reforms designed to dilute social and employment protections, bolster ALMPs and improve 'employability.'" Heyes (2013) suggests that a more effective strategy to address employment crises may be linking flexible training policies with industrial policies that provide workers with immediate economic relief and promote the growth of decent work. In other words, the dual goals of flexibility and security need to have equal weight if a flexicurity agenda is to be effective at both protecting

workers from economic shocks and allowing them to enter post-crisis periods with the skills they need.

These post-2008 moves toward a more flexible delivery of VET for learners and the labor market offer a potential template for reshaping VET policy and practice in the changing economy.

Over the past few decades, the European Union (EU) has made significant attempts to coordinate and formalize an agenda to create a fairer knowledge-based economic system in the face of globalization and technological change.

The goal has been to broaden and improve the attainment of human capital, skills, and education and training across its member states. These include EU policies like the Lisbon Agenda, which is intended to meet the goal of becoming the most competitive economy in the world (Lisbon European Council, 2000), as well as the Bologna Process, which is focused on removing barriers to reaching this goal and providing alternative opportunities to traditional academic education (Schulze-Cleven, 2017). Yet, even in Europe there are still clear cross-national and institutional differences in skills development and VET, with models that are more or less effective in certain regions and contexts.

EU VET and Future of Work Challenges

In the current environment, the EU is confronting significant challenges in adapting to the changing world of work, many of which have been exacerbated by pandemic-fueled shifts. The increasing pervasiveness of remote and digital working environments has both emphasized the need for digital skilling/upskilling and de-emphasized manual skills in labor markets across the EU. A recent forecast by the European Centre for the Development of Vocational Training predicted that, in sectors that have experienced outsized impacts from the pandemic, between one fifth and one quarter of new jobs created in the next decade will be at risk of automation (CEDEFOP, 2020). Moreover, pre-pandemic surveys showed that, while about 70 percent of adult workers in the EU need some form of digital skills to complete their jobs, about a third of these workers are at risk of digital skill gaps as workplace technology changes (CEDEFOP, 2016b). In their revised 2020 European Skills Agenda, the European Commission highlighted the need for ensuring that 70 percent of the EU adult population has basic digital skills (European Commission, 2020a). The realities will require both skilling systems for new workers and upskilling or reskilling of the current workforce.

Despite the strong systems for adult education, training, and retraining in the VET systems analyzed in this report, participation of adult workers in VET remains low across EU countries, only averaging around 11 percent in 2018 (European Commission, 2016). In addition, only about 1 in 10 unemployed adults across the EU have had a recent learning experience (European Commission, 2020b). Demands for adult reskilling may increase as the population continues to age across the EU. The working-age population is expected to decline every year through 2060, as is the ratio of working-age people to people 65 and older. In 2006, that ratio was 4:1; by 2050 the ratio is projected to reach 2:1 (Kiss, 2020). However, some countries in this

report—including Finland, Denmark, and France—have adult education and training participation rates upwards of 20 to 30 percent, underscoring how their approaches to adult education and retraining may stand out as successful exceptions among those of other EU countries (European Commission, 2016).

The European Commission has identified this issue as a core policy agenda item. Among other activities in its 2020 Skills Agenda, the Commission will be working toward the following goals of interest to the current study:

- Advance Skills Pacts—large-scale partnerships at the regional and industrial levels co-created by all stakeholders to advance training in upskilling within their domain.
- Strengthen skills intelligence mechanisms.
- Establish a new Europass online platform that will allow users to communicate their skills to prospective employers, connect to jobs, and enable training providers to issue digital diplomas.

The Commission will also be launching an initiative centered on individual learning accounts for adult learners and another on developing an EU-wide policy on micro-credentials by the end of 2021 (European Commission, 2020b).

Perhaps more pressing, while young graduates of VET systems across the EU have better employment prospects than general education graduates for at least their first decade on the labor market, this difference tends to disappear as workers get older. Moreover, about a quarter of young VET graduates are working in jobs that are at a high risk for automation. These employment prospects again emphasize the critical need for enhancing continuing education and retraining, particularly for VET graduates, across the EU. The OECD identified Germany, Denmark, and Austria as countries in which VET employment outcomes remain positive because of strong ties between VET institutions and social partners, relationships the organization recommends extending to member states with weaker VET systems (Organisation for Economic Co-operation and Development, 2020).

Young people across the EU have faced increasing volatility in the labor market since the Great Recession. Youth unemployment has been rising, now averaging at around 17 percent across the EU (Eurostat, 2021). Young people in the EU have also been disproportionately impacted by the wave of pandemic-fueled unemployment growth in 2020, resulting in an average youth unemployment rate of around 17 percent across the EU (Eurostat, 2021). In addition, recent analysis from CEDEFOP describes how a considerable proportion of young workers are overqualified for their jobs, underscoring how polarization in the labor market with a bias toward low-skilled jobs remains a persistent issue (CEDEFOP, 2015).

Labor market polarization has been an ongoing—and hotly debated—trend in the EU for at least the past two decades (Oesch & Piccitto, 2019). Across the EU, the share of middle-skilled workers has declined relative to more rapid growth at both the top and bottom of the skill distribution in the labor market. While automation is partially responsible for these changes, the

OECD concludes that at least since the 1990s, successive cohorts of young workers have been increasingly less likely to enter the labor market in middle-skill jobs (i.e., truck driver, machine operator, cashier, secretary) and much more likely to enter low-skilled work. In other words, over the past 20 years, workers whose education level was previously regarded as “middle-skilled” — those with at least some secondary education but no tertiary degree — are now more likely to be in low-skilled occupations (OECD, 2020).

Despite this EU-wide trend of labor market polarization, the OECD (2020) also identified exceptional countries such as Germany and Denmark that have counteracted this current. In these two countries, the rise in the share of middle-educated workers in high-skilled occupations has been relatively equal to those countries’ growth in low-skilled work. The OECD (2020) attributes these more positive developments to Germany’s and Denmark’s robust engagement in social dialogue as well as their strong emphasis on VET. Interestingly, as we examine in the individual country briefs appended to this report, these countries have different approaches to VET, yet both have been successful in upskilling middle-educated workers.

VET in Europe is viewed as a key part of the strategy in adapting to the changing nature of work due to technologies and automation. The EU as a whole and the individual countries we looked at in this study have all begun to adapt policy and practice to weather the transitions in national and local labor markets so that learners and workers can skill, upskill, and reskill (Schmit, 2020). Importantly, lifelong learning is a right that is enshrined in the European Pillar of Social Rights (European Commission, n.d.). Both the culture and structure of VET are increasingly being shaped to encompass this right, meaning that they have been developed in ways that at least theoretically allow learners including youth, learners with challenges, and older adults to learn new skills and move along educational and career pathways throughout the life course.

Lessons from EU VET for the United States

In recent years, responding to economic crises and the future of work has been a focus in both policy and practice for the EU as a whole and within our countries of focus. This has led to the development and implementation of several worker-focused practices designed to offer flexibility. In the discussion below we have chosen to prioritize discussion of flexibility-centered strategies that could be useful for technician skilling in the United States. Some of the themes we highlight here are not completely new to the US CTE context but thus far have been implemented differently due to context, policy, and culture.

Educational and Career Pathways

All six of the countries we examined have VET policies that allow for some combination of multiple entry and exit points, dual qualifications (academic and vocational), educational advancement, movement between vocational and academic pathways, and reskilling and upskilling. This flexibility in delivery provides opportunities for education and training for those who may have dropped out of the educational systems or those new to the country’s

educational system, such as migrants (Jeon, 2019). Additionally, flexible programming allows students and workers to continue their learning throughout the life course and to enter and exit work and education as needed.

Educational Pathways in VET with Multiple Entry and Exit Points

Early education in the EU context focuses on broad academic skills. All students in our six European countries of focus begin their education in compulsory primary education, which consists of academically focused study. Following primary education, students enter lower secondary education, which is the equivalent of middle school in the U.S. In most countries, students enter the lower secondary level around the age of 12 and finish between the ages of 14 and 16. This period of education is commonly organized around academic coursework but can include some vocational skill development. For example, Austria and Spain allow students to receive a year or two of VET at the lower secondary level. Following this, students enter upper secondary education, which is the equivalent of a US high school. In some countries, upper secondary education is optional. Table 1 summarizes the typical age of entry and exit into initial vocational education across the countries.

Table 1: Typical Age of Entry/Exit into Initial Vocational Education

Country	Typical Age of Entry	Typical Age of Exit
Austria	14	18-19
Denmark	17	18-21
Finland	16-17	19-20
France	15	17-18
Germany	16-17	18-19
Spain	15-16 at lower secondary level; 17 at upper secondary level	18

Programs in upper secondary education are often focused on either preparing students for tertiary education and/or employment, so it is at this stage where the bulk of VET occurs in the countries of study. Students typically select a career in their upper secondary education around the age of 16, somewhat earlier than is typical in the U.S., and this involves choosing an academic track or a vocational track. As discussed in more detail below, students are not bound by their original choices, in many cases both systems provide basic education and mechanisms that allow for later movement across programs.

There are three ways in which VET is offered in upper secondary: It is provided in the school system or vocational schools (dual VET), through apprenticeship/work-based learning, or through special programs. In this report we focus on dual VET, as its focus on providing learners with the opportunity to simultaneously earn a labor market credential and progress to tertiary education has made it increasingly popular among both workers and employers (CEDEFOP, n.d.).

Dual VET structures give students the opportunity to do both academic work and VET work, including work-based learning experiences.

These work-based experiences are managed in a variety of ways and include learning done in school simulation labs or onsite at company facilities. The dual VET structures are a part of the upper secondary school systems and will be discussed in more detail below.

Each country's programs offer multiple training options designed for different skills areas and occupations, ranging from carpentry to art, manufacturing, and service occupations. Across the six countries, the duration of upper secondary VET required for a degree or qualification range from one to five years. Learners can then enter post-secondary or tertiary VET programs for more specialized training, including professional baccalaureates and even some combined general education and vocational training master's programs. These higher education programs, which in combination last between one and five years, tend to offer multiple entry and exit points to allow frequent transitions between work and learning. For example, Austria has four separate hybrid VET/general education programs, each ranging from one to five years in duration. Graduates of these hybrid programs are granted the option of participating in a bridging program to enter into one of three 2- to 3-year post-secondary programs for specialization, including a master craftsperson qualification. There is also an option for VET students to enter a pathway to general education after completion of an upper secondary qualifying exam or a post-secondary program.

In Denmark there is one broad upper secondary VET program that lasts about four years, as well as a shorter two-year basic vocational program for struggling or unemployed job seekers and a hybrid four-year program. Completion of any of these programs can lead to a two-year professional program and/or a professional bachelor's program, which can then lead to a general education master's program. Finally, Finland's VET system has one upper secondary program that can lead to a general education bachelor's program, a further VET program, or, at the post-secondary level, a specialist VET program, all of which are flexible in time to completion. These systems are designed to provide clear structures for learners to progress across programs, even at different life stages. These varied structures can be seen in different aspects of the US systems, but there is more uniformity in implementation within each European country than there is in the US.

We often found, built into the clear structure of these VET systems, flexibility mechanisms that allow students to change pathways as circumstances demand. One such mechanism is the ability to move from traditional education to VET and vice versa. Denmark, for example, emphasizes a lifelong learning approach in which students can enter higher education after receiving a dual qualification/degree (VET and general education) or a VET post-secondary degree; conversely, students can transfer from general education to a post-secondary or tertiary VET program. Students can also receive partial qualifications and enter the labor market at various points along the educational pathway, then return to education at a later date to build upon their studies or learn a new skill.

Finland's VET system offers flexibility in terms of pathways. Finnish VET qualifications can be met in a myriad of ways: through VET school, apprenticeships, alternative training agreements, or a variety of other experiences and training as long as national program qualifications are met. Full VET qualifications at the upper secondary level can lead to a higher education pathway, and general education can lead to post-secondary and tertiary VET. Students are not required to complete each qualification and can combine them based on their needs in personalized learning plans. These plans are developed for each student by a teacher, guidance counselor, or other VET representative.

Austria and Spain also have VET systems designed to allow students in VET programs to enter general education, as well as to allow students in general education to enter VET at both the upper secondary and post-secondary and tertiary levels. The system in France gives students the ability to transfer from upper secondary general education to post-secondary VET, but it is less flexible than the Austrian and Spanish systems in that it lacks a formalized pathway to go from upper secondary VET to general education until completion of multiple programs at the tertiary level.

The least flexible system we examined is the German VET system. There, it is more difficult for students to change their VET pathway, especially since there are exams that are required for specific competences. The German system has a pronounced delineation in the structures and operation between VET and traditional academic systems that limits transferability, though there are still possible pathways to higher education depending on a student's relevant field of study. Albeit less flexible in transferability than other VET systems, Germany does have a specifically designed transition system for students who are low performing in their VET education and cannot secure a job or an apprenticeship. This system, which is primarily school-based and more decentralized than general VET, consists of one-year programs for pre-vocational, basic vocational, and introductory training, all with the goal of quickly providing students with skills for jobs or apprenticeships. In the US ability to shift and change pathways varies by state, institution, and program.

Dual VET

Dual VET systems are popular in the countries we examined. For example, in Germany, about 70 percent of all VET learners get their training through the dual VET system (CEDEFOP, 2016a). In addition to being popular in the countries of interest, dual VET has been an important focus of EU practice and policy since the Great Recession (Šćepanović & Artiles, 2020). The EU promotes the approach, provides incentives and supports to encourage its use, and helps countries implement apprenticeship and work-based learning into their formal education systems (Šćepanović & Artiles, 2020). Additionally, the promotion of dual VET is explicitly

encouraged as part of the Lisbon Strategy as a key means by which Europe can become a knowledge economy.

Apprenticeship in the U.S.

Like many countries in this report, labor unions in the U.S. have long been involved in vocational training through apprenticeship programs in sectors such as skilled trades. In fact, before the primarily community college-based VET system emerged in the U.S. in the early twentieth century, U.S. labor unions (where they existed) held a de facto monopoly on vocational education provision (Braverman, 1974). However, as union membership has declined over the past four decades, the scale and scope of apprenticeship offerings has become diminished. There are a little over 500,000 active apprentices in the U.S. each year (USDOL, 2021). However, interest in apprenticeships seems to be increasing. Like in Europe, for the most part, quality assurance for apprenticeship occurs at the national level in the U.S. through the Department of Labor's registered apprenticeship program. Recent efforts by the Obama administration provided more grant funding to public-private partnerships for apprenticeship expansion and allowed labor unions to act as private sector partners on behalf of employers. The Trump administration also directed funding to expanded

The dual VET approach is one of the key mechanisms for flexibility in VET pathways (CEDEFOP, 2016a). Students are not siloed into simply learning VET skills, but rather continue to learn academic skills while doing their vocational work. This means that some paths into tertiary or higher education remain open to dual VET students (CEDEFOP, n.d.). The extent to which these pathways are actually used by students, however, varies greatly from country to country (CEDEFOP, 2016a).

Dual VET is also one of the primary methods of responding to changes in the labor market. Literature in the field outlines a variety of benefits of dual training, which include reducing skill mismatches, reducing youth unemployment, improving competitiveness, and facilitating the integration of migrants (European Commission, 2012; Andersen, 2016; O'Reilly et al., 2015; Jeon, 2019; Šćepanović & Artiles, 2020). One oft-cited reason is that this system both requires and provides opportunities for schools to understand labor market needs and, through work-based learning opportunities, can ensure that students are learning the skills needed in the labor market (Šćepanović & Artiles, 2020). Because industry participates in the training—by providing on-the-job experience, serving as trainers, and/or consulting on competences and technologies required by employers—dual VET systems are better able to keep up with and respond to fast-paced technological change. Dual VET also provides a viable alternative to typical academic pathways, an important benefit in Europe where there are some concerns about over-qualification and mismatch for jobs (Šćepanović & Artiles, 2020). While both the Lisbon Strategy and the Europe 2020 strategy call for increases in higher education completion rates, the European Commission has noted that there may be too many workers with tertiary degrees working in jobs that do not require them (Andersen, 2016; CEDEFOP, n.d.). Dual VET provides one solution to this challenge. These same conversations about degree completion and labor market need are also happening in the US.

Though the benefits are clear, these systems are complicated to implement. Delivering a successful dual VET model requires collaboration between educational institutions, businesses, and unions (Busemeyer & Trampusch, 2012; Hall & Soskice, 2001; Šćepanović & Artiles, 2020). Countries and regional areas without these partnerships in place, or without adequate infrastructure to support them, will find it difficult to deliver a high-quality dual VET system. For example, in rural areas in Finland, school systems often deliver work-based training components themselves because they have difficulty finding enough spots in local businesses to respond to student demand. Our report on the Spanish system in Appendix E details some other challenges related to regional-level implementation. There are some similar models to this in the US in the form of sector strategies, but these are not uniformly implemented and their influence and impact on education varies. The most like model in the US might be sector strategies but their implementation varies as does the collaboration between partners.

Another challenge inherent in the dual VET model relates to equity. There is some evidence that these programs attract or select high-achieving students and are not serving students of color and students from lower socio-economic backgrounds at the same rate (Šćepanović & Artiles, 2020). These historically disadvantaged students may not be the ones selected by employers for the work-based learning spots (Haasler, 2020; Šćepanović & Artiles, 2020). Finally, another criticism is that this model often results in the provision of generous subsidies to the private sector, which means that they are expensive for the countries implementing them. Moreover, scholars question whether these subsidies are sustainable; since they often come from central European funds, they are subject to change with the whims of European policy priorities (Šćepanović & Artiles, 2020).

Post-Secondary/Tertiary VET

Academic and vocational pathways remain separated at the tertiary level, but there are commonalities in some of the coursework in terms of the theoretical offerings. In the six EU countries we studied, most tertiary VET focus on learners seeking to acquire a higher level of specialization (roughly equivalent to a master level) in their vocational field (CEDEFOP, n.d.). This may be due to the early decision-making on careers noted above. All six countries present students with a range of options in terms of disciplines at the tertiary VET level, but some countries focus more prominently on certain sector pathways than others. Austria, for example, emphasizes its healthcare pathway at this stage (CEDEFOP, n.d.). Entry into tertiary VET generally requires successful completion of upper secondary schooling, but educational institutions may create their own requirements for entry. These requirements might include an exam or evidence of work experience. In some countries, like Finland, there is such great demand for tertiary VET programs that it regularly exceeds the supply, making programs very competitive.

Tertiary courses and programs vary widely. Some are full-time courses leading to a diploma-level qualification that can take between two and four years. Some countries offer options for shorter skilling opportunities. For instance, Finland has moved toward a modularization of

learning outcomes and competences by developing partial awards for single or small collections of VET skills. These are aimed at lifelong learners and incumbent workers, allowing them to gain a quick skill and head back into the labor force or work while learning. This approach has great promise as a mechanism of flexibility and adaptation to the needs of a changing labor force. Of note, while it is theoretically possible for people in tertiary VET to transition to academic pathways, many scholars note that in practice this is not really feasible; for the most part the primary outcome for the majority of tertiary VET graduates is work (CEDEFOP, n.d.).

Adult Education & Retraining

Across the EU, the concept of lifelong learning is enshrined as a right and has become a major emphasis in policymaking around adult education and retraining. Reflective of their social democratic systems, a characteristic of nearly all countries studied is the durable public funding supports for adult learners seeking reskilling and upskilling. This is one of the important differences between the US and European system in terms of access and use.

These supports, which make VET free or accessible with financial assistance, make it easier for learners to acquire new skills at various points in the life course than it is in the US context.

As such, this funding is important not only for the individual learners who receive it, but also for the VET systems' ability to respond to changes in the labor market.

For example, many of the countries in our study provide adult learners with paid education leave they may use to reskill and upskill. In some countries, these supports are enshrined as legal rights for all citizens, helping to reduce the bureaucratic barriers that come with means-tested benefits (Pigeaud et al., 2019). Any constraints to accessing this benefit are typically based on requirements related to a minimum amount of time a worker must spend at their current employer and/or mandates to achieve a specific qualification or credential from their training.

Supports often come in the form of a wage subsidy based on current salary but may come in the form of a low-interest loan (i.e., Germany); such benefits can last for up to two years (Pigeaud et al., 2019; UNESCO, 2019). Some countries, such as France, even provide paid leave for adults to conduct a skills assessment and develop a training plan with an advisor (Pigeaud et al., 2019). Advising and other wraparound services for adult learners are also publicly supported in many countries in this study.

In some countries, employers can apply for public funding to provide their own training or develop a type of public-private partnership with a VET institution. In countries such as Austria and France, particular attention has been given to small- and medium-size enterprises, which are allowed to apply for state funding to identify training needs in their workforces and design coordinated training plans (Pigeaud et al., 2019; Chopra-McGowan & Reddy, 2020). In other countries, private enterprises may work with general adult education providers as well as educational institutions to upskill/reskill their workers (García-Longoria Serrano, 2006). In

countries like Germany, where aging in the workforce has become a prominent policy issue, companies have offered targeted training and support programs toward their older employees (Blau, 2011). Enterprises in countries such as Finland and Austria have taken on significant responsibilities as sites of training delivery (European Commission, 2021; OECD, 2020). Much of the robust public funding described above comes from liberal taxes on enterprises, with a “pay or train” doctrine undergirding how many states approach financing their retraining or upskilling initiatives. This is especially true in countries like France (Schreiber-Barsch, 2015). High union density in most of these countries has also helped produce labor markets in which most workers are covered by collective agreements that include training provisions and supports. In fact, a recent report from the OECD (2019a) found a strong correlation between collective bargaining coverage and the amount of collective training agreements, with upwards of 20 to 30 percent of collective agreements including training provisions in most of the countries included in this study. Trade unions themselves also play significant roles in both provision and policymaking around adult education and reskilling in all countries studied (OECD, 2019a).

All countries in this study had a diverse field of adult education providers, ranging from public institutions, universities, non-profit organizations, private contractors, internal company providers, religious organizations, and folk/popular education systems. In most cases, at least some public funding is provided to training organizations regardless of their relationship to the state. In addition to its role as a funder, the state typically serves as the agenda setter in terms of policy and requirements for providers, often in consultation with social partners. For example, Austria has a national-level quality assurance framework that defines basic standards and requirements that adult education providers must meet to receive public subsidies (Ö-CERT, n.d.). In France, the state works in a collaborative role with local authorities and education institutions to coordinate training provision (Schreiber-Barsch, 2015).

All countries in this study have long histories with popular notions of education that have informed a generalized recognition that opportunities for lifelong learning should be widely available, low-cost/free, provide individual enlightenment, and contribute to broader social goals of developing an informed and engaged democratic citizenry. Under this conceptualization of education, learning is as much a tool for collective emancipation as it is for individual development. Folk high schools with this mission are very common in Nordic countries as well as in Germany and Austria, and their curricula will often include opportunities for vocational education and training that can co-occur with other learning opportunities geared toward a learner’s self-actualization needs (European Commission, 2021; German Adult Education, n.d.). In addition to nationwide networks of community-rooted, popular education institutions, countries like Spain, France, and Denmark also offer full access to a regular VET system for adult learners (Sancha & Gutiérrez Dewar, 2019; Schreiber-Barsch, 2015; Dibbern, 2020) In fact, it is becoming increasingly common for post-secondary institutions in countries like Denmark to oversee both the mainstream and adult education systems, allowing for a lot of cross-permeability and a more diverse range of options for adults to reskill (Dibbern, 2020).

The democratic-emancipatory model for adult education exemplified in folk/popular education has allowed many adults to reskill within a more liberal education setting than in a traditional workforce development context. Yet, this connection to broader social goals is becoming less central to the policy agenda in many countries. Faced with more unstable labor markets and larger crises within social democratic systems, these programs are becoming more oriented around market-based neoliberal logics (Rasmussen et al., 2019). While this may help some workers survive the more volatile swings in the labor market, the mission of education as emancipation may be less central to the process.

Special Programs

Also emphasized in EU VET are provisions to accommodate students who may struggle academically or have special needs. These populations have become a growing concern in the discussion over decent jobs for workers of the future, especially given the negative labor market effects on these groups due to the recent pandemic (Schur et al., 2021). For example, Denmark's focus on lifelong and individualized learning involves free VET opportunities for adult learners and emphasizes providing VET to weaker learners. Struggling students can enter a short basic school- and work-based program that can be transferred to a main VET program or lead directly to the labor market. Alternately, students can attend an exam-free school of production program that focuses on practical skills and provides active guidance to career path options. The law also requires a specially designed upper secondary VET program for students with special needs that incorporates vocational, practical, and general education components in coordination with parents, students, and guidance services (Andersen & Helms, 2019). Austria offers an alternative pathway for upper secondary students that need extra time or greater individualized assistance for a dual qualification through its Vocational Training Assistance Service (Tritscher-Archan, 2016). Spain has an alternative, shorter basic VET program that can start at the lower secondary level and lead to a qualification for the labor market or to further education and, subsequently, to the main VET program (Sancha & Gutiérrez Dewar, 2019).

Qualifications

In most countries, including Germany, the state develops and standardizes VET qualifications in unison with other social partners like employers and union associations. However, some larger German employers with sufficient resources and training abilities also offer their own private certificates that are largely recognized by industry, allowing for another flexible option to German VET seekers. The normal repository for this kind of standardization is a National Qualifications Framework (NQF), one of which is present (or at least in the process of development and implementation) in all countries studied. These frameworks communicate the content and profile of the country's labor market qualifications—the expected knowledge and ability of anyone who holds the qualification. In line with the standard throughout the EU, countries in this report classify qualifications in eight stacked levels that are based on learning

U.S. VET Qualification Frameworks & Recognition of Prior Learning

Recent analysis has found that nearly a third of U.S. adults hold some form of non-degree credential (Cronen, et al., 2018). However, most of these credentials are awarded, assessed, and transferred on an institution-by-institution basis. Importantly, while recent efforts have highlighted the critical need for greater alignment on uniform standards for credential quality (Van Noy, et al., 2019), there are currently no mechanisms or systems to help U.S. workers, employers, policymakers, and educational institutions to define or measure the quality of credentials awarded outside of traditional vocational and academic education systems (Connecting Credentials, 2015). In addition, while most U.S. higher education institutions, particularly community colleges, have had long-standing policies on the recognition of prior learning acquired in non-school settings, these policies are again defined primarily at the institution or system level (Garcia & Leibrandt, 2020). The U.S. VET system could potentially learn a lot from how the states in these reports have designed and implemented their NQFs in order to encourage greater alignment and transferability of non-degree credentials and open up more pathways to VET qualifications beyond traditional community college structures.

outcomes. However, it is important to emphasize that the mere existence of an NQF in a given country does not automatically imply that the framework has strong regulatory functions or any legal effect on the VET system. For example, although Austria's NQF is used to guide the development of new qualifications, but is being primarily used to promote transparency for learners; not redesigning policy. (CEDEFOP, 2020).

The catalyst for the development for these frameworks has been the EU-driven European Qualifications Framework (EQF), which was formally established in 2008 and serves as the standard eight-level model for the NQFs subsequently developed by the countries in this report (Méhaut & Winch, 2012). Of the countries in this study, Austria, Finland, France, and Germany have formally linked their NQFs to the EQF, allowing for at least some portability of qualifications across borders within the EU (CEDEFOP, 2020). Moreover, the scope of NQFs in most countries studied cover both the general and VET systems, as well as training delivered outside of formal systems. This often means that an individual qualification can be achieved through a variety of education pathways, not singularly through formal VET education (CEDEFOP, 2020). The US lacks a system like this for non-degree workforce credentials and thus their value and role in the labor market is difficult to understand and translate to learners, employers, and other stakeholders.

The stackable structure of NQFs has encouraged (and, arguably, necessitated) the modularization of qualifications in many countries studied, although there is variance in how much modularization is emphasized and supported. For example, because both trade unions and many employers in Germany have a strong cultural attachment to the holistic nature that has historically been at the core of the German dual system, they tend to view moves toward modularization as a fundamental disruption to the social, political, and individual objectives of VET education in that country (Deissinger, 2019).

In contrast, in France, a more enthusiastic embrace of modularization has been present. Since 2014, the country has been advancing the notion of blocks of competences (*blocs de compétences*) in which competences within qualifications are organized based on socially meaningful activities and labor market applicability. France is also a good example of a country that has linked stackable and partial qualifications to its robust system of validating non-formal and informal learning, described more below and in the Appendix B. All qualifications in the country's NQF can be acquired through validation and are required to have a validation procedure specified. Finland's NQF also includes competence modules that are defined in learning outcomes and are comparable with qualifications (Pigeaud et al., 2019).

NQFs themselves can also be vehicles for administrative collaboration between the state, enterprises, worker representatives, and social partners. The development, maintenance, and quality assurance of these systems are usually conducted through cooperative arrangements at both the local and national level, with the state often serving as a basis for the institutionalization of these partnerships. Tripartite committees comprised of state, employer, and worker representatives are common in this regard, although the level of actual power that each social partner holds within these governing bodies varies somewhat across countries.

Skills

Many of the countries in this study are highly adept at identifying labor market skill needs as well as adapting qualifications and curricula as those needs shift. Skill anticipation activities are core parts of VET system governance in many countries studied. These involve leveraging what are typically collaborative research and monitoring institutions (sometimes required to be present in each industry) between state, labor, and private organizations to better understand labor market skill demands and adapt training programs as needed. For example, France is home to industry-based skills operators committees, which are collective bodies that use research capabilities to help anticipate training needs in industries and implement transition projects for workers through the use of personal training accounts and other funding schemes (Pigeaud et al., 2019).

Partnership between worker organizations, state, and industry in curriculum development is another mechanism by which skill needs are anticipated and addressed. In France, for example, vocational advisory committees (CPCs) are integral to the development of VET qualifications and are comprised of employers, trade unions, trainers, and state representatives. They are divided at the sector level and help to define VET qualifications based on the training needs of their respective labor markets (Pigeaud et al., 2019). There are also joint employment and vocational training committees in each industry made up of employer and trade union representatives that conduct research to identify training priorities and make requests for new qualifications to be added to the NQF as new skill needs arise.

Professional development of VET teachers is also a significant way in which vocational skills are kept current and relevant to labor market imperatives.

In Finland, for example, pedagogical training is updated continuously by vocational teacher education colleges, which is one way that VET competences and qualifications are kept up to date. Finland is also an example of a country in which VET teachers are encouraged to participate in professional development in real-world workplaces. This has multiple benefits. Teachers stay up to date on new technology and practices while both helping to enhance cooperation and collaboration between the education and business sectors and generating opportunities for work-based learning and employment for students (CEDEFOP, 2019; Finnish National Agency for Education, 2019).

Modularization

Modularization of VET qualifications has been an EU imperative as well as an adaptation to more rapid shifts in labor market skill needs.

This provides flexibility in reskilling and upskilling, often allows workers to validate their skills outside of formal training programs and gives students the opportunity to acquire partial and/or finite skills. In Finland, for example, VET qualifications have been based on modules and competence units for nearly three decades, and the Finnish VET system is broadly structured by individualization and choice in a learner's education pathway. Individual modules within a qualification can be assessed and certified separately and at various points in a training program, rather than solely through a final assessment, and learners can move in and out of training programs prior to their final assessment. Denmark's VET system is also heavily modularized, and there is no requirement for learners to complete modules in a specified order. Partial qualifications, known as *trin* in Denmark, can also be awarded to learners, although some trade unions and employers have raised concerns about the quality and value of these credentials (CEDEFOP, 2015a).

It is important to note, however, that in some countries studied, particularly in Germany and Austria, there is still a tension between module-based training programs and ones that are more explicitly aimed at developing a learner's occupational identity—or *Berufskonzept*, to use both

U.S. VET Modularization

While many countries in this report have moved to modularize existing VET qualifications and credentials, in the U.S., modularization is less common. Unlike countries such as Finland or Denmark, where a worker could theoretically acquire a partial qualification through an apprenticeship or other form of work-based training, recent analysis has shown that U.S. employers are unlikely to provide supplemental work-based training opportunities. As described earlier, without a more centralized system like an NQF, modularized U.S. credentials will continue to struggle with portability as well as having their value broadly recognized on the labor market (Cappelli, 2015).

the German and Austrian terminology. Moreover, even where modularization is present in training programs, content usually must be progressed through in a specified order, and full qualifications are still awarded only if a learner has completed the entire training curriculum. In other words, while blocks of competences may be part of a larger training curriculum, in these contexts, they typically cannot be separately assessed and validated outside of some specific pilot modularization programs (CEDEFOP, 2015a).

Recognition of Prior Learning

Flexibility in VET also emerges in the recognition of prior learning through assessments. The opportunity to demonstrate learning can save students time and money towards VET qualifications. It also contributes to lifelong learning opportunities for workers reskilling or upskilling. Recognized learning can typically include work experience, volunteer/community service, and other experience. In many cases, the recognition of prior learning is enshrined as a right for all citizens, and the process often occurs in a more centralized manner outside of individual institutional frameworks. For example, in France, the validation of prior learning occurs through a jury review. In addition, recognition of prior learning also serves as the basis for developing training plans and informing other services, such as guidance. In some countries, workers may be able to achieve a full qualification without having to attend any additional training. This, of course, speeds up the reskilling process, but the modular design of NQFs also broadens the domains in which training can be legitimately delivered in the sense that adults receiving training through adult education centers, in-company programming, or other informal learning sites can have that learning validated and seen as equivalent to training delivered at a VET or post-secondary institution. In the US, prior learning assessments often exist as policy in community colleges and other institutions of higher education, but in practice use is often low. A recent study in Colorado found that after implementation of a new prior learning assessment policy just under 4 percent of students in the Colorado Community College System received prior learning credit (McKay & M, 2019).

VET Curriculum, Policy, and Updates

VET Governance in the U.S.: Workforce Development Boards

As described in the paper, the “tripartite” governance structure for VET is common in Europe. In the U.S. one of the governance structures for adult vocational education system are state and local workforce development boards, which are sanctioned in law by the Workforce Innovation and Opportunity Act (WIOA)—the largest federal funding source for job training (Workforce Innovation and Opportunity Act, 2014). Importantly, while most countries in this report have rapidly scaled funding for vocational education as a proportion of national GDP, federal funding for WIOA has declined by nearly half since 2001 (National Skills Coalition, 2017). Moreover, unlike the fairly equal weight given to state, employer, and worker representatives in VET administration in the EU, the WIOA requires that state and local workforce development boards be employer-led, meaning that business representatives must make up at least 50 percent of the membership on these boards. The law requires that only 20 percent of these boards be comprised of worker representatives (Workforce Innovation and Opportunity Act, 2014). Some exceptions to this rule would be the state of Washington, which has operated its state workforce board in a tripartite structure since 1991 (Lam, 2019). Despite this unequal make-up in many states, state and local workforce development boards have been key vehicles for the implementation of sectoral training strategies in a variety of regions, particularly in the context of TAACCCT grants (McKay et al., 2013).

Curriculum development and adaptation is another way that EU VET works to respond to changes in the labor market.

There is some flexibility in teaching and possibilities for adaption within classrooms, institutions, and in regional areas. Additionally, work-based learning components of curricula serve as a way for students to get skilled on new technologies in the field. This is especially true when the work-based learning components of the curriculum are able to be offered in industry and with trainers from the field.

As noted above, European VET systems involve various partners including schools, training providers, employers, government agencies, and labor unions. These groups work together to fund, provide, monitor, and certify training. They also collaborate to develop and standardize VET curriculum. In some countries, like in Finland, Denmark, and Germany, the federal ministry of education is primarily responsible for this development and coordination with the social partners, whereas in others, like Spain and France, this role is shared by both the ministries of labor and education. Despite national curriculum standards, in all countries there is some level of regional authority and flexibility provided to individual territories to administer VET and thus shape curriculum. For example, in Germany, the federal government is responsible for in-company training and apprenticeships, while the local authorities administer school-based learning (Hippach-Schneider & Huismann, 2019). Employers are heavily involved at both levels. In Denmark, local VET plans are implemented in each region

based on national standards, but these plans are adapted with suggestions made by local governments, trade committees, and schools that administer VET.

A key aspect of flexibility in VET for adaptation to the changing nature of work is the ability to shape and change curriculum as needed.

All six of the EU countries in this study have some form of coordination at a national level between the state government, employers, labor, and other social partners to develop, implement, and change VET curriculum. Looking at VET curriculum development and implementation can help highlight effective policies and practices, how they are structured, and how they may have changed in the past decade to meet the challenges of globalization and technology. Further, as the U.S. lacks both comprehensive and generalized national VET curriculums as well as significant modularization provisions, these examples provide lessons and potential opportunities for US VET development at the federal, state, and local levels.

In France, the federal government develops curriculum, standards, exam qualifications, and quality assurance in consultation with business partners, while regional governments plan and define policies based on local needs determined in collaboration with social partners (Pigeaud et al., 2019). In Denmark, local VET plans are implemented in each region based on national standards, but they adapted with suggestions made by an advisory council made up of social partners and similarly organized local committees, as well as by teachers, trainers, school boards, and managers that control schools and administer VET (Andersen & Helms, 2019). Similarly, according to our interviewees from the Basque region of Spain, qualification standards in that country are centrally developed by social partners and are nationally recognized in the labor market. Smaller employers may still encourage and support Spain's school-based VET system locally, however, because they typically lack resources to offer apprenticeship programs that other firms in larger countries might have.

Delivery

The six VET systems we examined can also be categorized by how VET curriculum is implemented. For example, is curriculum delivered primarily by a state-run school, by an employer, or, as is most often the case, some form of both (see the first column in Table 2). These categories help to characterize the roles in the system of different social partners and the way these partners influence delivery. In particular, we focus on the role employers play, as their involvement in the process can help to promote the teaching and delivery of pertinent skills for the labor market. Still, it must be noted that although each country in this study has a VET system that offers apprenticeships, some may not be considered a pure collectivist skill formation system under this categorization, especially since apprenticeships may not always be available.

The German dual system, which is the most popular and commonly referenced VET apprenticeship model in Europe (Graf & Powell, 2017), is the main example used for collective

skill formation (Busemeyer & Trampusch, 2012). As characteristic of collectivist VET, German employers have a significant influence in VET curriculum and administration. This is part of the reason why apprenticeships are common and why the VET experts in Germany felt that apprenticeship qualifications were often valued more highly by employers than qualifications granted through VET schools. Austria's dual system also features apprenticeships and is characterized as having a collectivist skill formation system. VET there is still considered primarily school-based, however, mainly due to larger employers choosing more often not to provide apprenticeships and to favor school-based training instead (Busemeyer & Trampusch, 2012). Similarly, Denmark's VET is primarily school-based, but it is still considered to have a collectivist skill formation system (Busemeyer & Trampusch, 2012). The Danish system offers more training flexibility to firms and other VET institutions, and there is generally some form of paid apprenticeship function for every VET program offered. Students must first receive foundational education; then they can receive hands-on-training at the upper secondary level in the form of an apprenticeship (CEDEFOP, 2019).

Spain's VET is a statist system. Apprenticeships are available but not compulsory, and most VET is administered by schools, albeit with strong coordination with employers and input by unions, according to our expert interviewees. Nonetheless, there are work-based-learning components in main VET program curriculum at the upper secondary level and even as part of an early-stage VET program that begins at the lower secondary level. For example, many VET schools feature equipment and laboratories that reflect real workplace environments and are staffed by skilled teachers (Sancha & Gutiérrez Dewar, 2019). Like Spain, France has a strong state-driven VET and skill formation system (Busemeyer and Trampusch, 2012). Although primarily delivered by schools, French VET offers apprenticeships that lead to the same curriculum qualifications issues by VET schools. They are offered through dedicated apprenticeship training centers that coordinate the arrangements between students and employers.

As noted above:

the balance between schools and employers helps provide flexibility for the worker, as does the association with the school system.

When done well, this can present learners with opportunities for mobility and pathway changes.

Due to the liberal attributes of the U.S., such as the primacy of market relations, the disincentive for firms to invest in general skills that can be used in competing firms, and the similar risk aversion of employees to invest in specific skills for a particular employer that can limit their employment opportunities (Estevez-Abe et al., 2001), the U.S. is unlikely to shift toward a purely collectivist or statist VET system. However, this does not negate the ability of employers to engage with policymakers, community colleges, and other VET stakeholders on curriculum development, which they would directly benefit from.

Table 2: Skill Formation System Classification (Busemeyer & Trampusch, 2012) of the VET Systems of Six European Countries Based on Their Primary Approach to Curriculum Development and Implementation

	Primary Approach to VET Development and Implementation	Skill Formation System ¹
Germany	Dual System (Employer-based)	Collectivist
Austria	Dual System (School-based)	Collectivist
Denmark	Dual System (School-Based)	Collectivist
Finland	Flexible State/School System	Statist
Spain	State/School System	Statist
France	State/School System	Statist

¹ See page 4 for a discussion of Busemeyer and Trampusch’s (2012) categories

VET Teaching, Teacher Training, and Professional Development

In the EU countries in this study;

VET teaching is generally paid well, requires continuous education and training, is culturally respected as an important part of the economy and national consciousness, has opportunities for professional development, and may allow for flexibility to innovate and adapt to changing technologies.

In Finland for example, teaching at the secondary level, especially in VET, requires an appropriate higher-education degree with pedagogical studies and a minimum three years’ work experience, and is a highly sought after and well-paid occupation offering autonomy and continuous training (CEDEFOP, 2019; Finnish National Agency for Education, 2019). Conversely, in the U.S., K-12 public education teachers need a bachelor’s or master’s degree to qualify to take an initial teaching licensure exam, which they must pass (the particular exam and requirements vary by state [Broderick, 2021]), but teachers are often neither paid nor valued in the same way their European counterparts are. In fact, in the U.S., there is a 20 percent pay penalty when teacher salaries are compared with those of non-teacher college graduates with similar characteristics and experience (Allegretto and Mishel, 2020).

VET teachers’ involvement in a variety of components in the VET system gives them a vital role in shaping learning for students and keeping curriculum up to date. They are generally considered major stakeholders in the curriculum development process, working closely with the state and social partners in most countries studied. For example, in Denmark, VET teachers, teacher unions, and other VET stakeholders are represented on a national advisory council that develops standardized curriculum, and they are represented at the local level on VET bodies that make decisions on and administer VET curricular reforms (CEDEFOP, 2012). Similarly, in Austria, where schools are allowed to be flexible in adapting their curriculum to focus on certain areas to meet regional economic needs, VET teachers are key components in the curriculum development process (CEDEFOP, 2015ca).

VET teachers are also typically involved in the design and implementation of individual learning plans for students as part of dual or apprenticeship systems. For example, every VET program in Finland is individualized for students, and teachers are involved in the development of individual programs of study. Teachers may also work with representatives from industry in the development of these plans (CEDEFOP, 2019).

Teachers are also expected to participate in some form of professional development, which in some cases, like in Finland, professional development can include time working in industry.

These opportunities help teachers maintain good relationships with local business while keeping their skills up to date.

VET Funding

Most VET in the EU, at all levels, is publicly funded.

There may be variance across which bodies allocate funding and disperse it: For example, numerous federal and local government bodies as well as employers, unions, and their respective associations and chambers contribute to VET (Hippach-Schneider & Huismann, 2019). This wide variety of funding streams mean that VET is generally free of charge to students in lower and (if available) upper secondary VET programs and in many cases is no or low cost for tertiary and adult education as well. This funding reality makes initial and continuing VET training more accessible to students and workers in the EU than it is under the US CTE system. The fact that community colleges remain the primary site of vocational training provision in the U.S. means that, without scholarships or other forms of financial aid, many U.S. VET students incur fairly significant direct and indirect training costs.

VET Financing in the US: New Jersey as an Example

While we have previously noted that the US VET system often incurs significant out-of-pocket costs on its users, there are some more local level examples of different regions replicating EU models of VET financing. In 1992, New Jersey created a Workforce Development Partnership Fund, which provides training grants to dislocated and disadvantaged workers as well as employer-provided training for incumbent workers. Unlike France, which places the funding burden primarily on employers, the New Jersey fund is supported by small joint payroll contributions from workers and employers (Fair, 1999). However, the New Jersey fund is far from universal and only accessible to a small number of workers that qualify. This fund does underscore that tax policy could potentially be shifted to encourage more employer responsibility in VET financing as well as provide greater economic incentives in VET recruitment.

Across the six countries in this study, initial or primary VET is free to students through state funding.

In Finland, VET at all levels is publicly funded through taxes and is free to students. Even when employers take on apprentices, compensation is provided by the VET provider to employers to cover the cost of workplace training. State-based VET in France gives all workers who wish to continue training the right to access 20 hours of personal training per year within a personal training account (Pigeaud et al., 2019). Private sector workers are eligible for training leaves of up to one year or 1,200 hours to enroll in part-time training programs from VET providers, which is funded by an education tax on employers that equates to 80 percent or more of the workers' salary (Schreiber-Barsch, 2015). Since 2019, these employees are also entitled to personal training support in the form of 500 euros per year over the course of 10 years, with even more for employees with low qualifications, for the purpose of enrolling in career transition programs. Some of this training is funded by employers who are then reimbursed by the state (Pigeaud et al., 2019). Overall, the French VET system draws on various funding sources depending on the program: Continuing VET is primarily funded by taxes on employers, though the regions and state contribute a significant amount of their own funding, while individual students also pay a small share (less than 6% of total expenditures as of 2015) (Pigeaud et al., 2019).

Industry Upskilling/Retraining Examples

U.S. Union-Management Training Partnerships

The European examples here are just a sample of what are very common union-management training partnerships throughout the EU, which are often encouraged by the very administrative structure of European VET systems themselves. Union-management training partnerships are not entirely absent in the U.S., but they are almost always negotiated at the level of individual employers and unions, limiting their scope and impact. Despite these limitations, throughout the 1990s and early 2000s culinary union locals in the Hotel Employees and Restaurant Employees International Union (HERE) were instrumental in negotiating training programs and union-run training academies for both prospective and incumbent workers to help provide relevant industry skills as well as broader transversal vocational education that could assist workers in upgrading. Some of these were even established at a regional level through negotiations with multiple hotel employers (Waddoups, 2002). Similar training funds have also been won by unions in the healthcare sector, such as the District 1199C Training & Upgrading Fund, which also organizes its own training courses for healthcare workers (Takahashi & Meléndez, 2004).

Manufacturing (Germany, Denmark)

In Germany, trade unions and employers in manufacturing industries have negotiated several sector-level agreements that regulate financial incentives and educational leave for continuing education and training. These are typically based on sector-specific training needs in

anticipation of market shifts. Collective agreements in the metal and electrical industries provide workers with the right to take part- and full-time education leave for up to seven years. Additionally, many of these agreements provide educational accounts (*Bildungskonten*), which allow workers to accrue funds toward educational leave. Collective agreements in the chemical industry also include provisions to build capacity for personnel planning and career guidance in firms (OECD, 2021a). Examples of employer-supported training schemes include German chemical corporation BASF's Generations@Work initiative, which targets older adult workers with lifelong training programs as well as other wraparound services such as career guidance, health maintenance, and ergonomic support (Blau, 2011).

It is important to keep in mind that both union and collective bargaining coverage is uneven in Germany, which has the lowest percentage of collective bargaining coverage of the countries in this report (OECD, 2021b). This means that not all workers benefit from the agreements described above, and workers who are low-skilled and/or at the bottom of the wage scale are particularly unlikely to benefit.

In Denmark, *CO-Industri* (the Danish industrial trade union representing nearly all industrial workers) and *Dansk Industri* (the Danish industrial employer association) negotiated a collective agreement in 2007 that created an industry competence development fund (*Industriens Kompetencefonden*). Under this agreement, all companies in the manufacturing sector are required to contribute a fixed amount per employee that helps cover the cost of a two-week paid training leave for workers in these industries each year. Combining this funding with state unemployment benefits, workers have the cost of their training fully covered and receive 85 percent of their lost wages for the duration of their training. Travel costs can also be covered depending on the length of travel required (CEDEFOP, 2009).

The rationale behind this agreement was to allow workers the opportunity to make more proactive training decisions and provide more flexibility in their continuing education and training pathways. Traditionally, worker training activities in Denmark have been negotiated between workers and their managers. Under this agreement, workers can train in competences of their own choosing and gain necessary skills before transferring to another industry (CEDEFOP, 2009).

Danish sectoral training funds like the one described above are very common throughout the country. However, the heavily state-funded continuing VET (CVET) sector reduces the need for direct private financing through collective agreements between unions and employers. Experts underscore that the true utility of sectoral training funds in Denmark is their ability to bring labor and management closely together to address CVET issues. Most of these funds are, like the *CO-Industri/Dansk Industri* agreement, overseen by bipartite committees of workers and employers. Members of these committees typically collaborate on developing pilot courses and research projects on skill needs, and they work together to reform CVET courses to meet current labor market conditions. Some training funds engage in more systematic training planning

within enterprises in their respective industry. These activities usually spark feedback processes that help influence and shape public CVET sector programming (CEDEFOP, 2009).

Information and Communication Technology (Spain)

In Spain, the trade union UGT (*Unión General de Trabajadores*) and Ametic, the ICT (information and communication technologies) employer association, recently finalized an agreement that stipulates that if jobs in the ICT sector are destroyed or transformed due to the introduction of new technologies, actions will be taken to identify new options for job creation. Moreover, relevant social partners in the Spanish ICT sector have signed a manifesto for digital talent that highlights the need to improve education and training to promote digital upskilling, adapt to new technologies, and increase the gender ratio of the sector's workforce (UNI Global Union, 2019).

UGT has also signed an agreement with Google that stipulates that the company will train 200 trade union members, free of charge, in transversal digital skills. Upon completion of the training, these workers will become trainers themselves and train an additional 5,000 workers in various sectors through an online training platform (UNI Global Union, 2019). As part of the agreement, Google has agreed not to collect any personal data on participants, an issue that has become a particular concern for many worker representatives in the ICT sector across the EU as workplace technologies gain more surveillance capabilities (UNI Global Union, 2019).

Biotechnology (France)

In 2020, the French biotechnology sector announced a first-of-its-kind training platform called the Campus Biotech Digital. Financed through a public-private partnership and led by large companies in the field, training organizations, digital companies, biotech equipment manufacturers, and small- and medium-sized enterprises, the online campus is aimed at upskilling workers in the field to meet new technological challenges (bioMérieux, 2020).

According to bioMérieux, a biotech diagnostics company that helps form the backbone of the initiative, the French biotech sector is expected to create thousands of new jobs within the next decade. This surge in new positions will likely create a skill shortage that Campus Biotech Digital is attempting to counteract. Training programs will encompass the entire production chain in the sector, leveraging new learning technologies such as augmented/immersive reality and AI cognitive learning approaches to upskill workers in emergent processes and professional practices as workplaces in the industry change. Programs will be targeted to both current and incumbent workers (bioMérieux, 2020).

Conclusion

European VET systems provide insight and tools that could be helpful in the development of national, state, regional, and institutional policy and practice of US CTE. While there are some key differences in country structures between the U.S. and the EU that make total replication of

any of the VET systems outlined here impossible, the activities to create a structured yet flexible approach to VET that Europe undertook after the Great Recession have great value when it comes to thinking about how the U.S. can respond to labor market crises. This is especially important now. Economic crises beget moves toward change, and in the post-pandemic recovery, shifts in CTE practice and policy in the U.S. may be more possible and necessary than ever before. In many cases, the strategies outlined in this report are already being used in the U.S., but they are not implemented in the same ways or are not as clearly outlined in policy. In other cases, such as financing CTE, the U.S. is in a more nascent stage. The common thread we found across VET systems in all the EU countries we studied was a move toward flexibility, and as such, we believe that to be the most important lesson to carry over to the US CTE system. Below we identify themes that emerged in our work that could be useful considerations for inserting and/or centralizing flexibility into US CTE policy and practice.

- **Multiple Entry and Exit Points:** A flexible VET system has opportunities for learners to move between work and employment. Learners must be able to exit and enter the system as needed to acquire skills and credentials.
- **Educational Pathways:** A flexible VET system allows movement between pathways from academic coursework to VET. It also has opportunities for educational progression.
- **Recognition of Non-Institutional Learning:** A flexible VET system allows learners to demonstrate and document prior learning and knowledge.
- **Curriculum:** A flexible VET system both allows for and encourages adaptations to curriculum to meet labor market needs. In some cases, these adaptations could be localized to respond to area needs.
- **Modularization:** A flexible VET system enables learners to receive formal acknowledgement for the acquisition of individual skills or skill sets through a modularized curriculum.
- **Work-based Learning:** A flexible VET system includes opportunities for work-based learning so that students can learn skills needed in industry and find pathways to employment.
- **Teacher Training and Professional Development:** A flexible VET system provides opportunities for teachers to learn new things and, in the best instances, learn from industry to help them shape the learning experience to respond to labor market needs.
- **VET Financing:** A flexible VET system provides low or no cost training to learners to make skills development and enhancement accessible to all potential learners. It also takes into account other indirect costs incurred during training such as transportation, childcare, and guidance.
- **Shared Governance:** A flexible VET system is based on shared responsibility between workers, employers, and the state, with all actors holding relatively equal weight in the administration, governance, and design of VET systems.

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