

Varieties of work-based higher education: France, Germany and the United States compared

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Abstract

In recent years, higher education systems worldwide have been marked by a considerable expansion of work-based higher education (WBHE), with the institutional spheres of academia, industry and state increasingly coming together. We take the case of WBHE to analyse institutional arrangements in the different skill formation systems of France, Germany and the United States. We ask: Which factors drive the development of WBHE programmes and how does their governance compare across the three distinct country settings? The study finds that the growth of WBHE in all three countries indicates a reconfiguration of education and training governance of high skills. Nonetheless, actor constellations, organizational interests and especially the degree of state intervention surrounding WBHE remain anchored in long-standing national skill formation patterns.

INTRODUCTION

With the rise of the global knowledge economy, traditional configurations between higher education (HE), industry, and the state have shifted in many countries. The ‘entrepreneurial university’ has taken on a central role in the production of innovative technologies and

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economic growth, increasingly establishing business links and engaging in commercial activities with country-dependent degrees of state involvement (Etzkowitz, 2013). We can also observe an expansion of university-business cooperation in the form of strategic alliances for cooperative research (Mascarenhas et al., 2018; Santoro & Gopalakrishnan, 2000), university spin-offs (e.g., Miranda et al., 2018), academic engagement in knowledge and technology transfer (e.g., Perkmann et al., 2013), or joint university-industry laboratories (e.g., Borah & Ellwood, 2022). However, one expanding type of cooperation between universities and the world of work has remained largely underexplored: work-based higher education (WBHE) programmes. WBHE combines academic learning with periods of work experience, the latter including both internships and work experiences that alternate with study periods (Haddara & Skanes, 2007). WBHE bridges the institutional fields of HE and vocational education and training (VET), bringing together actors from university, industry and, depending on the country case, the state. While WBHE was introduced throughout the twentieth century in countries including the United States (1906), France (1960s) and Germany (1970s), it has gained momentum in recent years. We find, for instance, that in Germany, *dual study programmes* are increasingly used to recruit talented youths into work-based training. In France, *alternance programmes* have permeated both secondary and postsecondary levels of education. In the United States, *cooperative study programmes* (co-ops) have caught policy makers' attention as a way of addressing skill mismatches. We compare these three countries and their WBHE programmes. While the WBHE programmes feature organizational particularities, they represent functional equivalents (Van Deth, 2013) when it comes to fulfilling societal and economic needs for upskilling by combining elements of VET and HE. Yet, despite their growing relevance, little is known about the governance of WBHE across different skill formation systems. This gap in the literature is striking given that WBHE can provide pertinent insights into how skill formation systems navigate the trilateral relationship between university, industry and state.

Against this backdrop, our paper explores key governance aspects related to WBHE. The term governance implies that the political steering of this form of education and training goes beyond state activity, that is, it involves a strong role for private and civil society actors (Anheier, 2019). Employing a contrastive, exploratory institutional research design, we compare the governance of WBHE across three distinct country cases: France, which features a state-dominated HE and VET system; Germany, with its Humboldtian HE and collective VET governance; and the United States, which embraces a market-based skill formation system. Our analysis is guided by the following questions: First, how does the governance of WBHE compare across the different country contexts? Second, what drives the development of WBHE in Germany, France, and the US? To analyse WBHE in different skill formation systems, we adopt an interdisciplinary institutional framework that draws on perspectives from political science and sociology. Our study employs document analysis, expert interviews in all three countries, and a review of the available secondary literature. While we provide concise historical overviews of WBHE, our primary focus lies in the cross-country comparison of WBHE in the contemporary period.

Next, we conceptualize the governance of WBHE. This is followed by the presentation of our research design. Subsequently, we provide an exploratory analysis of WBHE's key characteristics in France, Germany and the United States. Then, we discuss the drivers of and (conflicting) interests in WBHE and provide an outlook on further avenues for research.

CONCEPTUALIZING THE GOVERNANCE OF WORK-BASED HIGHER EDUCATION

The novel forms of training studied in this paper are located at the interface of the institutional spheres of HE and VET, making it essential to deploy theoretical perspectives that allow an analysis of both. We therefore take inspiration from an interdisciplinary analytical framework which combines perspectives from sociology and political science given that organizational sociology is typically concerned with developments in HE, while political economy research centres more around firm-oriented VET. More specifically, we draw on recent conceptual work related to governance dimensions in work-based training systems (Graf & Lohse, 2021) that brings together the two disciplinary perspectives (sociology and political science) with the goal of identifying the governance structures of WBHE located at the interface between VET and HE. The chosen conceptual framework differentiates between four core analytical governance dimensions (Table 1). The basic assumption of this framework is that it is usually not feasible to establish work-oriented forms of professional training solely through state or market-based governance; instead, more complex interactions likely exist with regard to different aspects of educational programmes including curricula or financing. Potentially relevant stakeholders include educational organizations, public governance organizations, individual firms, employers' associations and employees. Thus, the four dimensions we present next are well-suited for our analysis as they emphasize multiple actors and their agency.

By pointing to the world of work nexus (GOV1), as well as the decentralized cooperation of individual employers (GOV2), we consider two core features that traditionally characterize the governance of work-based training systems. The degree of actor involvement from the world of work in educational programmes, associated with increased skills-applicability and smooth school-to-work-transitions (Euler, 2013), is captured in the first dimension 'GOV1-World of work'. One example of a typical manifestation of this involvement is social-partnership governance, as found in traditional coordinated market economies, where employer and employee representatives cooperate collectively, often under passive supervision of state authorities (Greiner, 2005; Hall & Soskice, 2001; Thelen, 2014). Since the postindustrial era, governance arrangements between core actors in industrial relation systems are sometimes configured in more flexible ways, beyond traditional forms of social partnership (Graf, 2018). In this context, we also observe varying degrees of institutionalization and formalization of actor involvement including employers, employees, schools and the state.

In the second governance dimension (GOV2-Inter-employer cooperation), we examine the cooperation between employers in WBHE governance. This is often referred to as the degree of decentralized cooperation of employers in skill formation (Culpepper, 2003; Culpepper & Thelen, 2008; Streeck & Kenworthy, 2003). Such cooperation, again, can be formal or informal

TABLE 1 Governance dimensions (GOV).

World of work nexus	GOV1-World of work
Employer cooperation to avoid market failure	GOV2-Inter-employer cooperation
Influence of educational organizations as independent institutional actors	GOV3-Educational organizations as actors
Financing (theory and practice phases)	GOV4-Financing

Source: Graf and Lohse (2021, p. 222).

and strongly or weakly institutionalized. For instance, systematic involvement of intermediary organizations like employers' associations or chambers of commerce is usually indicative of a high level of institutionalization (Emmenegger et al. 2019). A crucial puzzle is how firms that are usually in competition with each other learn to cooperate successfully—for example, to prevent the poaching of workers.

GOV3 (educational organizations as actors) leans on organizational theory by highlighting the significant influence of educational organizations as independent institutional actors (Brint & Karabel, 1991). Hence, this third dimension captures the level of individual organizations and their actorhood. In this context, organizational sociologists (e.g., for community colleges in the United States, see Brint & Karabel, 1991) and education researchers (Gonon & Maurer, 2012) have demonstrated that the management staff of educational organizations, who usually want to strengthen the position and legitimacy of their own organization, can significantly shape institutional change in their organizational field. In this context, market-based HE systems have been particularly linked to practices of new managerialism, that is, a growing dominance of academic managers over academic staff in the name of enhancing resource efficiency (Deem, 1998; Vican et al., 2020).

Finally, governance characteristics of educational programmes are usually directly related to aspects of financing (GOV4-Financing). Especially in the case of work-oriented training forms with high employer involvement the financial aspect is of utmost and potentially conflict-laden importance (Busemeyer & Trampusch, 2012). Hence, a central question is: Who bears the training costs? Here, we can distinguish, for instance, between the financing of the theoretical and the practical components of training. For work-oriented training forms, a mixed-type financing by the government and training firms is a common configuration.

Next, we present the research framework that guides our comparative study.

RESEARCH DESIGN, METHODS AND DATA

This study draws on a 'most different systems design' to uncover similarities and differences in the governance of WBHE across the skill formation systems of Germany, France and the United States—traditionally seen as distinct (e.g., Pilz, 2016)—from the 2010s until 2022. In Germany, skill formation is traditionally marked by a strong institutional separation between Humboldtian HE and collectively organized VET (Scott & Pasqualoni, 2016; Powell et al., 2012). The former is traditionally known for its strong research orientation, unity of research and teaching and involvement of the academic community in HE governance; the latter for dual training at the secondary level in which apprentices are trained both in the workplace and at the vocational school. In the state-dominated skill formation system of France, the state not only closely controls HE administration and curricula, but also regulates entry to the professions, and traditionally mediates ties between university and industry (Dobbins et al., 2011; Neave, 2003). Here, VET at the secondary level is best known for state-dominated full-time vocational schooling, while the most prestigious HE organizations are the *grandes écoles* that often prepare for state service or professional careers in large French (national) enterprises. Market-based HE systems, such as the US case, are conceptionally closer to the industry (Brown, 2011). They prioritize marketability, for instance, by aligning study offers to in-demand skills and knowledge fields (Minocha et al., 2017). The US features a college-for-all mentality, suggesting a limited role and prestige for VET at the secondary educational level (Powell et al., 2012). The emphasis on liberal education traditionally upholds a separation of the university

from professional training (Healy et al., 2014, p. 15). Moreover, in the market-oriented skill formation model, the state traditionally plays a limited role both in HE and VET governance and VET traditionally occurs in the form of on-the-job-learning in the workplace (Fortwengel & Jackson, 2016).

However, despite these differences between Germany, France and the United States, which each represent a major type of skill formation system, we find a common trend in terms of the development and expansion of WBHE. This, in turn, explains why we consider these countries relevant cases for our comparative analysis. For our comparison, we build on a dense descriptive conceptualization. Scholars have emphasized the crucial role of descriptive conceptualizations as a basis for comparative analyses (Adcock & Collier, 2001). In this article, information on the overarching context conditions is drawn from a range of sources. We analysed relevant secondary literature and primary documents from the fields of VET and HE, such as legal texts and policy documents by public agencies, websites and mission statements of major actors in the field, and data reports by national statistics offices. In addition, we rely on interview data from around 10 semistructured expert interviews per country for background information.¹ The interviewees included the management staff of educational organizations, senior representatives of public authorities, experts from chambers of commerce and employers' associations, key intermediary organizations in VET and HE and experts from thematically relevant think tanks. The experts were selected based on their ability to speak competently about relevant developments in WBHE both at the regional and national levels. To interpret the expert interviews, theory-based qualitative content analysis tools were used (Gläser & Laudel, 2009). The findings from the interviews were subsequently crosschecked with the available documents and secondary literature. This made it possible to identify central categories and their manifestations based on the empirical material.

Next, the case studies for Germany, France and the United States are presented. To introduce the respective skill formation systems, each country section begins with an overview of relevant educational structures, pathways and actors. Each section also includes a short account of the history and main drivers of WBHE. On this basis, important aspects related to the four abovementioned key governance dimensions for WBHE (Table 1) are highlighted.

ANALYSING WORK-BASED HIGHER EDUCATION IN FRANCE, GERMANY AND THE UNITED STATES

Germany: The bottom-up evolution of dual study programmes driven by large companies

Germany is marked by a strong traditional separation between HE and VET (Baethge, 2006). It features a state-financed HE system that remains rather dominated by the academic community with relatively low market interference (Dobbins et al., 2011). The Humboldtian ideal type conceives of the university as an organization in pursuit of pure scientific inquiry rather than specialized training (Clark, 1983). Given the long-standing separation between HE and VET, vocationally oriented training traditionally takes place in Germany's highly

¹For a complete list of interviews carried out for the cases of Germany and the United States, see Graf (2013; 2017); for France, see (Bernhard, 2017).

developed VET sector. The latter is recognized globally for its dual apprenticeship training at the secondary level and collective governance model (Busemeyer & Trampusch, 2012; Martin, 2012; Wiemann, 2021) as well as a corresponding company culture (Pilz, 2009). This collective governance—based on the cooperation between employers, unions and the state—has been linked to a range of positive effects, such as low levels of youth unemployment and a strength in diversified quality production (e.g., Busemeyer, 2015), but also criticized, for instance, for its stratifying effect (Solga, 2009).

While the core institutional configuration of the two separated HE and VET field remains unchanged, the expansion of dual study programmes has begun to erode this longstanding educational schism. Dual study programmes are situated at the interface between VET and HE. As hybrid organizational forms, they connect organizational and institutional elements of the classic VET and the classic HE system (Graf, 2016). The emergence of dual study programmes from the late 1960s onwards was a largely subversive response by large industrial firms to address the perceived academic drift resulting from the planned transformation of former vocational and engineering schools into universities of applied sciences. That is, they were launched by industry leaders in Baden-Wuerttemberg to safeguard their hold on high-end VET, which they were afraid to lose due to the growing academic autonomy of the new universities of applied sciences (Kahlert, 2006). The first dual study programmes were thus a bottom-up initiative by local stakeholders (Graf 2018).

Recently, the Federal Ministry of Education and Research (BMBF) stated that ‘dual study programmes in Germany are en vogue’ (BMBF, 2022, p. 2). The Federal Institute for Vocational Training lists close to 1749 dual study programmes with around 120,517 students (BIBB, 2023, p. 11). Since 2004, the number of dual study programmes has more than tripled, while student enrolments and the number of firms involved has more than doubled (BIBB, 2023, p. 11). Dual study programmes are particularly common in economics, engineering and computer sciences, but also in health care—that is, subjects that are close to the ‘world of work’ and often associated with high-skilled jobs. The continuing expansion of dual study programmes has led to an increasing differentiation of the German HE landscape in these subject areas. The providers of dual study programmes, next to the employers that offer workplace training, are primarily universities of applied sciences (53%), dual universities (32%) and vocational academies (11%). In addition, some traditional research universities offer such programmes (1%) (BIBB, 2020, p. 25). In the abovementioned subject areas, dual study programmes already represent a sizeable proportion of the relevant student groups. In Baden-Wuerttemberg—where these programmes were first established—about 10% of students are enrolled in dual-study programmes (Statistik-BW, 2022). While the total number of apprentices in the traditional dual system at the upper-secondary level is far higher (approx. 1.3 million) (DESTATIS, 2022), dual-study programmes attract disproportionately high numbers of exceptionally capable youths. This diversion from the traditional system is largely driven by rising educational aspirations (Severing & Teichler, 2013). In this sense, the rise of dual study programmes represents a specific development within the more general trend in Germany of HE expansion at the cost of VET (Baethge & Wolter, 2015).

Dual study programmes work on the basic principle of systematically linking theory-based and practical phases at an organizational and content level, leading to bachelor's or master's degrees, and, in the case of apprenticeship-integrating programmes, to a double qualification (bachelor's degree and apprenticeship certificate). These programmes are not part of the higher vocational training system (such as master craftsman or technician training). Instead, they are located within the HE system. Departing from commonly required criteria for the accreditation

of bachelor's degrees, the specific form of a dual study programmes is mainly determined within a negotiation process between the HE organization and the associated companies. This is reflected, among other things, in an overall much lower level of standardization and institutionalization of learning processes in the dual study programmes, compared to traditional apprenticeships (GOV1-World of work nexus). For example, unions have little involvement in the establishment and development of dual study programmes as they are less involved in HE than VET. Employer influence is therefore structurally less constrained than it is in the traditional VET system (Busse, 2009; Heidemann & Koch, 2013). In WBHE, the participating companies can usually directly negotiate the design of dual study programmes with universities—which is facilitated by German universities enjoying far-reaching autonomy both in teaching and research in most fields of study (German Basic Law, article 5 paragraph 3). The state typically exercises a major control function only indirectly, via accreditation agencies for bachelor's and master's degree programmes. The expansion of dual study programmes is governed less by educational policy actors in a top-down manner; instead, it is driven from the bottom up by large and medium-sized companies that cooperate with HE organizations interested in innovative degree programmes (Graf, 2018). Many HE organizations with an applied orientation have realized that these programmes are an efficient way of recruiting talented students, allowing the HE organizations to position themselves vis-à-vis traditional research universities (Jahn, 1999). Thus, HE organizations assume a relatively strong position in the governance of dual study programmes, especially compared to vocational schools (GOV3-Educ. organizations as actors).

The specific arrangements of in-company learning as well as the payment of students varies (Becker, 2006). Only for the apprenticeship-integrating dual study programmes are there more universal in-company and external standards pertaining to the vocational qualification additionally obtained within the programmes. More generally, while the practical part of dual study programmes is financed by the training companies, the exact mix of private and public funding for the theory part varies from case to case (GOV4-Financing). In addition, dual study programmes challenge the already fragile education policy tradition of decentralized cooperation between large, medium-sized and small companies in organizing VET (GOV2-Inter-employer cooperation). Especially for smaller companies, it is often too burdensome to develop and implement such a programme. Conversely, large companies are significantly more relevant for HE organizations than small ones because they can sometimes fill entire classrooms by themselves (Krone, 2015). Large companies with a significant proportion of dual students at one site, therefore, tend to exert strong influence on the design of the programme-curricula. The result is a bargaining process in which the universities and company representatives negotiate the course content. Furthermore, chambers of commerce, which are traditionally a central component of the decentralized cooperation between companies, are of little importance within dual study programmes (Becker, 2006; Busse, 2009). The strong influence of individual companies on the design of specific dual study programmes can therefore jeopardize the holistic quality of both the academic and the vocational components of the training, thus favoring firm-specific content (GOV1-World of work). This, in turn, can reduce the transferability of skills and make students more dependent on individual firms.

To summarize, WBHE has become very prominent in Germany through the expansion of dual study programmes. These have emerged in a bottom-up process, granting significant influence over study content to both employers and universities. We now turn to the analysis of WBHE in France.

France: State-driven evolution and growing significance of alternance programmes in higher education

Similar to Germany, France has a long tradition of VET, albeit with a more limited involvement of private companies, relatively strong state control, and a longstanding involvement of both secondary and tertiary levels of education. Important reputational differences exist between the various types of work-based training (Powell et al., 2012): At the secondary level, VET is considered to be less prestigious relative to academically oriented schools, with VET appearing as more of an option for underperforming students (Brauns, 1998; Finkenzeller, 2018). At the tertiary level, the reputation of WBHE programmes increases with the length of the programme (2-year, 3-year vs. 5-year programmes). A reason for these status differences lies in the pronounced selectivity of vocational programmes at the HE level, which allows for a more concentrated allocation of resources compared to mass universities' general courses (anonymized-for-peer-review, Brinbaum & Guénard, 2013).

France witnessed a steep increase of vocational programmes in HE organizations over the last 60 years (Agulhon et al., 2012). This evolution was heavily driven by the French state, which recognized the need to enhance HE organizations' links with employers to better match labour supply and demand during the 1970s and 1980s (Bernhard, 2017). Firms were introduced as learning environments (beyond internships) to HE in 1987 with the passing of the *Seguin law*. The latter presents students with the opportunity to obtain any vocational degree (from secondary to tertiary level) via *alternance*—that is, by alternating between work- and university-based learning, thus formally introducing WBHE in an effort to optimize labour market transitions (Abriac et al., 2009; Arrighi & Brochier, 2009). Over the past 10 years in particular, the French state has launched several initiatives to convince companies and individuals of the benefits of apprenticeships and WBHE ('L'apprentissage, que d'avantages', Ministère du Travail, 2014, p. 1). In 2017, for instance, the French government planned to establish 500,000 new apprenticeships, stressing that 'the collective commitment to apprenticeship is at the heart of the government's action' (Gouvernement, 2012, p.1).

Nowadays, a variety of vocational programmes across a range of specialized higher education institutions offer vocationally oriented HE degrees. WBHE takes place across four types of institutions: The (1) otherwise nonselective *universities* offer vocational programmes with comparably selective admission policies, making selectivity a common component across the French vocational HE system. The most elite WBHE programmes exist at the (2) *grandes écoles*, which typically require applicants to complete 2-year long *classes préparatoires* (Van Zanten & Maxwell, 2015). (3) The *instituts universitaires de technologie* (IUTs) offer vocational programmes at the bachelor's level only. IUTs are part of the academic system, while still enjoying extensive autonomy (Giret, 2018). Students can further enrol in shorter 2-year programmes at the (4) *sections de technicien supérieur* (STS) that are located in secondary schools but nevertheless offer postsecondary qualifications.

Not only the strictly vocationally oriented institutions (IUTs and STS) have seen a surge in the number of students enrolling in *alternance* programmes, but also regular universities, and even the prestigious *grandes écoles*, which have traditionally focused on the professional education of the country's elite. While in 1995/96 only 20,050 students were enrolled as apprentices in HE, the number has increased enormously; reaching 576,000 students in 2022 (Brouillaud, 2023, p. 1). These apprentices have come to outnumber the share of apprentices at the secondary school level making up 51.4% of all apprentices and 11.6% of all HE students (MESRI, 2022). From 2005 onwards, WBHE growth accelerated with the introduction of the

professional bachelor's and master's degrees (MESRI, 2022). The 2018 'Law for the freedom to choose one's professional future' had an even more pronounced impact on the expansion of WBHE (MESRI, 2022): First, the age limit for apprenticeships was raised from 26 to 30 years, with apprenticeship starting dates now being flexible throughout the year. Second, the regulations pertaining to the establishment of apprenticeship training centres (*centres de formation d'apprentis*, CFA), which were pivotal for institutionalizing *alternance* programmes, were greatly liberalized. They are now less dependent on the approval of the regions and can be initiated by individual companies and industry branches (Ministère du Travail, 2018).

Any WBHE programme is based on a labour contract between the employer, the student and the vocational training centre (CFA). The French state plays a central role in the governance of WBHE. Crucially, the French Labour Code provides a detailed legal framework for WBHE programmes via national laws decreed by the Ministry of Higher Education, Research and Innovation (MESRI) (Law no. 2011-893 of 28 July 2011), including rights and responsibilities of employers, educational organizations and students. The 2018 'law for the freedom to choose one's professional future' marked the creation of a new public body, *France Compétences*, which is responsible for quality control of all VET programmes and also the maintenance of the Qualifications Register (RNCP) where all qualifications required to carry out a particular profession are registered. The strategic orientation of *France Compétences* is decided by its governance body, which unites representatives from the state, the regions, trade unions, employers' organizations at national and cross-industry levels, and experts. The state remains the main actor, however, with increasingly shared responsibilities across the social partners (GOV1-World of work). *France Compétences* observes the costs and levels of funding for training and oversees the newly created 'skills operators' (*opérateurs de compétences*, OPCOs), joint bodies organized by professional sectors and managed by social partners, which distribute training funds, support skills anticipation in small- and medium-sized enterprises (SME), and provide assistance in training programme design and professional qualifications (CEDEFOP, 2022). The bulk of WBHE-funding stems from companies. Thus, French employers pay a state-administered training levy to finance the apprenticeship system. The 'skills operators' distribute these funds according to the level of coverage determined by the professional branches and the standardized salaries of *alternance* students under supervision of *France Compétences*. Given this mandatory training levy and the possibility to jointly initiate CFAs, interemployer coordination is growing stronger in France (GOV2-Inter-employer coordination). In addition to the employer-based training levy, the state partially or fully covers social security fees, while the regions provide funding for the CFAs (CEDEFOP, 2023). We can thus observe a mixed funding model of WBHE in France (GOV4-Financing).

HE organizations display a varying degree of agency in the governance of WBHE programmes (GOV3-Educ. organizations as actors). Universities, STS, IUTs and *grandes écoles* must sign *alternance* cooperation agreements with a CFA. Despite the important administrative, and sometimes even educational role of the CFAs, it is, however, the HE organization which issues the diploma (MESRI, 2017). The apprenticeship curricula are organized by the CFA with strong involvement of the social partners (anonymized-for-peer-review). However, an apprenticeship training unit (*unité de formation*, UFA) can be created, allowing HE organizations to rely administratively and financially on the structure of a CFA, while keeping the pedagogical responsibility. It is also possible for HE organizations to establish a CFA themselves, thus sidelining the social partners. For example, one *grande école* used its high status in the HE hierarchy along with its financial independence to create a CFA and corresponding curriculum to cater to its specific needs—partially ignoring industry demands

throughout this endeavour (Pierrel, 2017). Thus, HE organizations' leverage in WBHE governance can be seen to increase with prestige.

To summarize, WBHE has become very prominent in France through the massive expansion of alternance programmes across HE organizations. The expansion was driven in particular by the French state. However, over time, companies increased their influence on the governance of these programmes, their study contents, and the CFA. We now turn to the case of WBHE in the United States.

United States: The growing importance of registered apprenticeships and co-op study programmes in a market-oriented context

Given the 'college for all' mentality in the United States, VET programmes have enjoyed far less prominence than in Germany or France, except in certain trades (Lerman, 2014; Nicholson & Fortwengel, 2015). High school focuses on general education with a very limited vocational education component (Gonon, 2009, p. 85). Apprenticeships in the United States—unlike those in France and Germany—are not commonly offered at the secondary level (US Department of Education, 2005). Instead, VET in the US usually involves courses at the postsecondary level, with work-based training typically taking place at technical schools or community colleges (Graf and Powell, 2017). In this context, it is crucial to note the extraordinary diversity of HE organizations in the United States—especially compared to the relative qualitative homogeneity of traditional HE organizations in Germany and France (Schreiterer, 2008). The quality of in-company training typically increases with the educational level, meaning that postsecondary vocational training is usually of higher quality than secondary-level training. Overall, work-based training has grown in importance in the education policy debate in the United States (Lerman, 2014; Rein, 2013), where it is often considered a prerequisite for encouraging the 'reshoring' of the previously offshored manufacturing industry to the United States (Powell & Fortwengel, 2014). Quite strikingly, the expansion of VET is a bi-partisan endeavour, having featured on the policy agenda during the Obama (2008–2016), Trump (2016–2020) and Biden (2020–) administrations (Biden Harris Democrats, 2022; Fortwengel & Jackson, 2016; Palmadessa, 2020). In 2022, the Biden Administration took 'key steps to make highly effective apprenticeship programmes more sustainable and more accessible' by expanding registered apprenticeships (which offer more worker protection than nonregistered alternatives) and informing employers of best practices for programme development (Joint Economic Committee Democrats, 2022).

In the United States, two models of WBHE are especially relevant to our comparison: (a) apprenticeships offered by community colleges, and (b) cooperative study programmes (co-ops) at community colleges and traditional universities. Besides these two main types, there are many different formats of work-based training in the United States, partly due to the limited presence of employer coordination at the sectoral level (Hall & Soskice, 2001). However, these other formats are not directly comparable with the German and French models since they do not involve a systematic linkage between the two learning sites of company and school/HE institution. The two formats analysed here are thus not representative of VET in the United States as a whole, as they constitute the high-quality end of the spectrum of work-based training programmes. (A) Community colleges are an integral part of the US higher education system and act as central hubs for HE-based apprenticeships (Reed, 2013). In the United States there are 1043 mostly public community colleges, which enrol 39% of all undergraduate

students in the United States (AACC [American Association of Community Colleges], 2022, p. 1). With average annual student fees of \$3800, studying for a degree at a community college is significantly cheaper than attending a traditional 4-year HE institution (AACC, 2022, p. 2). After 2 years, students can obtain a so-called associate's degree, allowing a transition into the labour market. In addition, there is the option of subsequently transferring into the third year of a traditional 4-year institution (Townsend, 2001). Community colleges thus fulfil multiple functions as they convey basic and advanced education, while also acting as an institutional bridge between high school and the traditional universities (Cohen et al., 2014). The expansion of high-quality vocational training at community colleges is seen as a way of improving the reputation of community colleges, which often falls behind that of 4-year universities despite their generally successful graduate placements and earnings.

Community colleges often provide the theory component of apprenticeships and cooperate with companies offering in-house training.² In 2021, there were more than 593,000 apprentices enrolled in 19,260 apprenticeship-training courses registered by the US Department of Labour (US Department of Labour, 2022).³ Since the 1990s there has been a proliferation of regional/sectoral training initiatives in the United States that facilitate the cooperation among firms and between private and public actors including community colleges (Rogers & Parker, 1996). One example is the Apprenticeship 2000 programme, which is organized in collaboration with the Central Piedmont Community College and eight partner companies in North Carolina (Powell & Fortwengel, 2014).

Companies from German-speaking countries have played a significant role in jointly shaping successful work-based training programmes in the United States in the early stages, with, for instance, the German or Swiss dual apprenticeship serving as a model for local adaptations. However, the American apprenticeship model differs considerably from most secondary level dual apprenticeship models in Europe. Thus, training programmes in the United States are considerably more varied, for example, regarding binding quality standards for the company-based part of the training (Lerman, 2014) (GOV1-World of word nexus). At the same time, the governance of VET in the United States is usually less influenced by the supervision of the social partners or by decentralized cooperation between employers, but rather by direct cooperation between the representatives of the community colleges and the individual companies (GOV2-Inter-employer cooperation). In some sectors, such as the health care sector or the construction industry, there are also trade unions that jointly organize apprenticeships. In some cases—such as the Apprenticeship 2000 programme—companies come together at the regional level to achieve a sufficient class size to establish an apprenticeship training programme at a community college. However, overall, the VET system in the United States is characterized by diverse options and functions and, more generally, 'flexibility without a system'. As a result, the management and staff of community colleges play a crucial role in the design and quality assurance in the sector of work-based training (GOV3-Educ. organizations as actors). In this model, the companies typically finance the in-house part of the training, the students' salaries and usually the tuition fees for the community college (GOV4-Financing). Overall, the regulative framework for apprenticeships is relatively lax, providing few binding rules, which, in turn, implies that employers have a strong say in terms of the curricular content of the programmes.

²In addition to community colleges, there are, for example, private postsecondary educational institutions that offer apprenticeships.

³The registration of an apprenticeship programme with the Department of Labour is voluntary.

In addition to apprenticeships that aim to train skilled workers, there are (b) traditional universities and community colleges that offer cooperative programmes (co-ops), which—similarly to dual study programmes in Germany or alternance programmes in France—integrate work-based practical phases. The first co-op programme was established in 1906 at the University of Cincinnati (Tanaka, 2014). The growth of this new training type was modest in the first 50 years; in 1960, there were only 65 such programmes in the entire United States. However, in recent times interest in co-op programmes has risen sharply. In 2014, there were over 900 colleges that provide co-op programmes, offered in almost all subjects and catering to over 170,000 undergraduate and more than 4000 graduate students (Wilson, 2014, p. 350).

One of the largest American providers of co-op programmes is the private Northeastern University in Boston, which established its co-op programme 1909. In 2019/20 more than 9000 students were enrolled in co-ops spanning the subject areas of media and design, business administration, computer science, engineering, health sciences, natural sciences, law, and human and social sciences (Northeastern University, 2020). Three thousand one hundred and sixty five employers in the United States and in 131 countries worldwide are registered as industry partners (Northeastern University, 2022). In a 5-year bachelor's degree, students complete up to three paid 6-month practical phases (or up to two in the optional 4-year variety).

Co-op programmes are intended to prepare their 'student-employees' for middle management positions by linking learning sites in companies and universities, typically leading to a bachelor's degree. Prospective students initially apply to the university and are then assisted in finding suitable employers for their practical work phases. There are no general standards regarding the organization of this training type (GOV1-World of work nexus). Hence, there is no uniform regulation regarding the payment of the students during the practical phase, or regarding the question of whether the company (partially) covers the student's tuition fees, which, in the case of Northeastern University, currently stand at around \$59,000 per academic year (GOV4-Financing). In co-op programmes, social partnership governance is of limited influence. For the company-based phases, the relevant state labour legislation applies. Decentralized cooperation between employers is also secondary; instead, the companies compete for talented individuals from the pool of students and graduates (GOV2-Inter-employer cooperation). What is crucial for the initiation and implementation of co-op programmes—in addition to the participating companies—is the university management (GOV3-Educ. organizations as actors).

To summarize, US skill formation has seen an expansion of WBHE especially in the form of apprenticeships and co-op programmes. These are strongly shaped by the educational organizations which establish relations with partnering firms. State interference is relatively limited in the US case. We next compare the drivers for and the key governance dimensions of WBHE for all three countries, and discuss the questions whose interests prevail in WBHE.

COMPARISON AND DISCUSSION

In this section, we compare WBHE in Germany, France and the United States based on the governance dimensions previously introduced (Table 2). The systematic comparison reveals some common developments across the three country settings, but also pertinent differences. Most notably, the degree of institutionalized employer influence (GOV1) and inter-employer cooperation (GOV2) significantly differs across the three cases—and reflects long-standing skill formation configurations in the respective country settings. Thus, WBHE in the liberal HE

TABLE 2 Stylized representation of the governance dimensions of WBHE in France, Germany and the United States.

	Germany: Dual study programmes	France: <i>Alternances</i> in HE	USA: Apprenticeships at community colleges and co-ops at universities
GOV1: World of work nexus	Medium-level institutionalization with limited involvement of the state; less formalized than in the case of traditional dual apprenticeships	Strongly institutionalized through the state via <i>France Compétences</i> , CFAs, the French Labour Code and the Qualifications Register (RNCP)	Weakly institutionalized, limited formalization; standard-setting through the state plays a minor role
GOV2: Interemployer cooperation	Limited (e.g., via consultation in supervisory boards of the programmes)	Increasing cooperation within industry branches to establish new CFAs and WBHE programmes	Very limited (employers compete for talent, poaching)
GOV3: Role of educational organisation as an actor	Strong, yet sometimes employers can dominate programme design	Medium to low as educational organizations are administratively and financially reliant on CFA and <i>France Compétences</i> (state supervision via standardized qualifications register); degree of agency varies according to organizational status and reputation	Strong due to very limited state supervision, universities/colleges directly cooperate with companies, but companies can strongly influence curricular content
GOV4: Financing	Theory: State and partly employer; Practice: Employer	Mainly state-funded but with employer share for theory and practice parts via a state-administered training levy (due to this levy all firms participate in financing WBHE)	Theory: State, college/university, students via tuition fees (exact configuration depending on type of HE organization) Practice: Employer

Source: Authors' own.

system of the US displays the least institutionalized and formalized world of work nexus. In line with this weak institutionalization of employer influence, US employers rarely cooperate, and often compete for talented workers instead. Compared to the classic German dual apprenticeship model, dual-study programmes in Germany are shaped by less formalization and institutionalization regarding the influence of actors from the world of work. For instance, union involvement is comparably limited. Still, German WBHE displays a higher degree of world of work institutionalization than the US equivalents due to the long-standing tradition of collective governance in skill formation still permeating the WBHE field. In France, where the state traditionally mediates ties between university and industry, the world of world nexus is strongly institutionalized through the public body *France Compétences* and the CFAs, along with the French Labour Code and the Qualifications Register. French employers increasingly

cooperate to establish new CFAs and WBHE programmes, not least because all firms contribute to WBHE financing through a mandatory state levy, which does not exist in Germany or the United States. The state assumes a relevant role in the financing of WBHE programmes (GOV4) in all three countries. However, in the United States, employers usually finance the practice phase only, while for the theory part financial burdens are potentially imposed on the student via tuition fees.

Apart from these governance differences, a striking similarity across the three country settings lies in the way educational organizations influence WBHE as independent institutional actors (GOV3). Both in the case of German dual study programmes, and US apprenticeships and co-ops, the involved educational organizations (colleges and universities) display a great degree of agency given that they design their programmes and establish employer relations in a relatively independent way. Even in France, where state-control of HE organizations has traditionally been high, HE organizations display a visible degree of agency in the governance of their *alternance* programmes, for instance by successfully pushing towards the creation of CFAs and study programmes suited to their needs. In the highly stratified French HE system, organizations' agency seems to be linked to organizational prestige, with *grandes écoles* having the most leeway for influencing WBHE governance.

Our analysis suggests that the expansion of WBHE across all three country settings points to a reconfiguration of high-skills governance. Educational organizations increasingly act as institutional actors in their own right even in France and Germany. Nonetheless, governance aspects pertaining to employer-coordination, financing and especially the degree of institutionalized world of work remain anchored in long-standing institutionalized national skill formation patterns.

OUTLOOK

Our comparative study illustrated that in France, Germany and the United States, WBHE plays a growing role in the overall skill formation system, with the institutional spheres of the university, industry and state increasingly coming together in education and training. Our analysis finds that the growth of WBHE in all three countries is indicative of a reconfiguration of education and training governance of high skills at the education-economy nexus. Nonetheless, we found that actor constellations, organizational interests and especially the degree of state intervention surrounding work-based higher education remain anchored in long-standing institutionalized national skill formation patterns. This applies to the key drivers for the development of WBHE, its key governance dimensions, and the question whose interests prevails in the sector of WBHE. For instance, in Germany we observe a bottom-up evolution of dual study programmes driven by large companies, while the French case is one of a rather state-driven growth of *alternance* programmes in HE. In turn, the US case is characterized by an increasing importance of registered apprenticeships and co-op study programmes developed by various actors on the ground within a market-oriented context. In each case the relevant actors have advanced gradual (rather than radical) forms of institutional change that can take place even in strongly path-dependent settings such as national skill formation systems (Thelen, 2004). Thus, overall, German dual study programmes present an incremental change in terms of an innovative form of advanced skill formation, but one that remains embedded within the tradition of a rather collective governance system compared to the other country cases. In France, the expansion of *alternance* programmes within HE is

indicative of a gradual change in which employers gain some more influence, but it is a form of change that, generally speaking, is compatible with and maintains a rather strong steering role for the state. In the case of the United States, we observe a gradual increase in coordination between actors to advance, for instance, co-op study programmes, but the implementation of these programmes is still unfolding within the context of a mainly marked-based skill formation system.

Interestingly, while these differences are associated with variations in the specific governance dimensions (world of work nexus, interemployer cooperation, educational organizations as actors, and financing) and imply that the role, power and responsibilities of the key actors are distributed in distinct ways, each of these cases represents a possible pathway to develop, expand and institutionalize WBHE as a form of high-skill formation still rarely studied. This is because most of the literature either focusses on exploring VET or HE, while the actors in the field have recognized the need to increasingly overcome the divide between the two sectors to advance new forms of academically based practice-oriented knowledge, skills and competences in a rapidly changing environment. The WBHE programmes in all three countries have gradually evolved and contribute to advancing such an innovative, advanced form of skill formation. They have been in high demand by employers and students and have been considered adequate means to tackle skills shortages also by policy makers. Indeed, despite the distinct institutional contexts, this demand has been sufficient to prompt a comparable development across cases.

Further research is needed to unpack in more detail the learning processes within the respective locations of learning (seminar room, workplace and sometimes training centres) as well as their internal coordination. This perspective may yield additional insights into the operation of WBHE in the three countries. While we had the opportunity to study three country cases often considered as key examples of major models of education and training, for future research it would be interesting to test the generalizability of our findings by examining other cases representing similar models—such as Switzerland for a coordinated system, Sweden for the state-dominated system or Canada for the market-oriented system—to explore whether corresponding patterns can be identified.

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